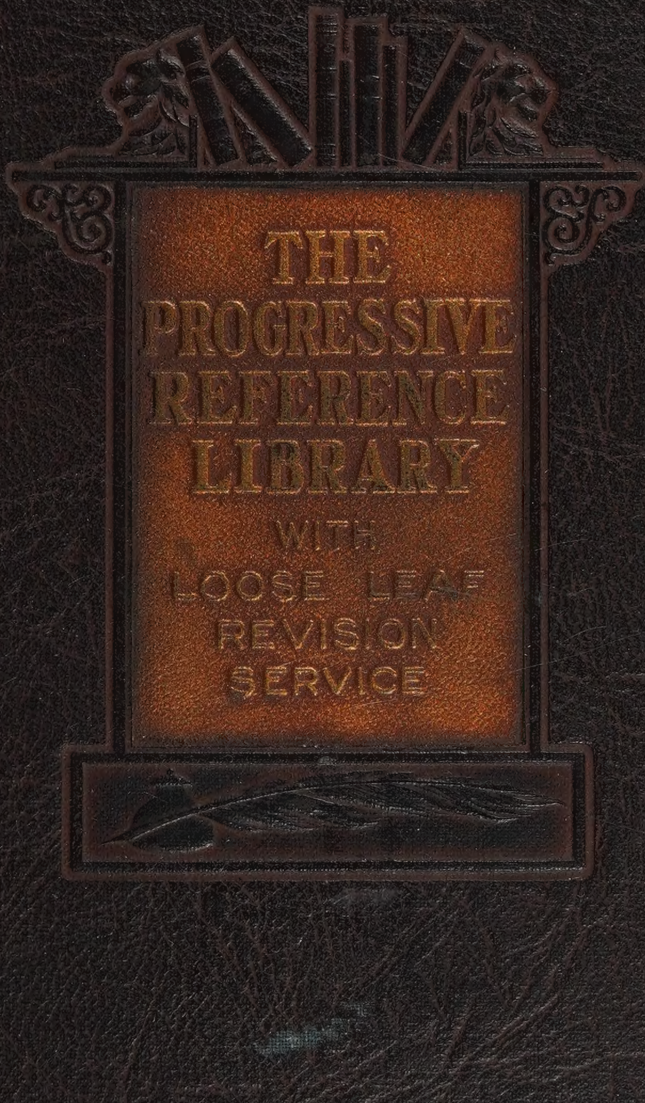

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VOLUME I

1930

THE HOLST PUBLISHING COMPANY

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PREFACE

THIS work of reference is given to the public as the result of many years of labor and application of energy. Men and women of recognized ability, especially those engaged in educational work, have been freely consulted in gathering the material and in putting it together for easy, convenient, and useful reference. The product of this research is not the accumulated knowledge of one individual, nor even of one class of critics and investigators, but it represents the fund which has been gathered by the diligent research of many.

A work of general reference, such as this publication, has a place in the homes and schools wherever facts of human experience are of utility. This has been recognized in accumulating the material and arranging the subject-matter, making the volumes that constitute the set of books both convenient for use and of utility in finding the desired information.

The value of a work of this kind depends to a large extent upon the accuracy of the information which it contains. Therefore, to secure reliable information and place it in the most convenient form have been important objects of the editors, and to which they gave their undeviating attention.

To obtain the newer information, a large amount of correspondence was necessary. Letters were written by the correspondence department to all the civilized countries of the world, and the responses obtained in this way furnished a large part of the material to build up the departments that involve the newer and more progressive ideas of the world in politics, commerce, and other civilized arts. In addition, men and institutions were invited to give freely their views of what a library of reference should contain. The former brought together the more vital facts, while the latter enabled the editors to arrange and classify them in the most helpful manner.

Students, both at home and in the school, are frequently in need of help in the spelling and pronunciation of names and other words. This work is an ideal aid from this standpoint, since all but the simplest titles are divided into syllables and the vowels are marked diacritically. This wholesome feature has been universally commended by professors in colleges and teachers in all classes of schools.

The possession of a modern encyclopaedic work of reference enables the student to make his own hours of study. He may become his own teacher, at least to a large extent, and by diligent search find the information which makes self-reliance a reality.

No labor and expense have been spared to make the volumes a real help to the students in all the departments of educational work. The pupils in the grades will find a vast fund of information to supplement the courses of study. Indeed, to secure such a help as they require has been the direct aim of many teachers and school superintendents who contributed to make the work of special value along this line.

The maps are the newest and are richly colored so as to convey the best possible idea of contour and outline. Many fine colored plates have been embodied in the work, giving accurate ideas of the form and color in nature, especially of such objects as shells, gems, minerals, flowers, and birds. The physiological manikins are recognized to be the best that were ever produced, showing lifelike colors and the relative size of the organs. These fine works of art, supplemented by concise and clear descriptive matter, are invaluable in research work.

The type is clear and readable. A system of cross reference enables those consulting the articles to obtain the benefits that would be found in a much larger work. Reference is made both by the Latin term *quo vide* (q. v.) and by distinct indication of certain titles or sub-heads.

While many American and British works were consulted, special mention may be made of the *Century Dictionary*, the *Standard Dictionary*, the *Webster's International Dictionary*, and the *Encyclopaedia Britannica.* Credit is likewise due to Spamer's *Konversation Lexikon*, Brockhaus' *Konversation Lexikon*, and Muret's *Encyclopédie.*

Hundreds of letters were written by the publishers to prominent educators, including college professors and county, city, and state superintendents. The purpose was to obtain a consensus of views regarding what are generally considered essential elements of a modern reference work. The responses were carefully studied in connection with the representative school courses of study. In addition, a large number of prominent educators and others contributed articles relative to important topics, including educational themes, cities, states, and institutions. To these the editors are greatly indebted for valuable assistance.

To sum up the objects of the editors, it may be said that the aim was to prepare a work which, while comprehensive and complete within its scope, would be adequate to the demands and prove, like the dictionary, a requisite in every library and on the desk of every home and school. Such a work, it would seem, should commend itself to all who coöperate in promoting the greatest aims of the human race—the conservation of knowledge and the proper education of the rising generation.

B. P. H.

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Secretary, Chamber of Commerce, Kenton, Ohio.

BARNES, E. L.,
Secretary, Chamber of Commerce, Kirksville, Missouri.

EWING, ROBERT,
Secretary-Treasurer, George Peabody College, Nashville, Tennessee.

WEST, W. W.,
Manager, Chamber of Commerce, La Crosse, Wisconsin.

McCURRY, JULIAN B.,
Secretary, Chamber of Commerce, Lake City, Florida.

NOVAK, E. J.,
Manager, Association of Commerce, Lake Charles, Louisiana.

SEXAUER, C. H.,
Secretary, Chamber of Commerce, Lancaster, Ohio.

MUMM, CHARLES,
Secretary, Chamber of Commerce, Laredo, Texas.

HAMMOND, DAVIS S.,
Secretary, Chamber of Commerce, Lebanon, Pennsylvania.

HAAS, H. D.,
Secretary, Chamber of Commerce, Le Mars, Iowa.

ROY, J. A.,
Secretary, Board of Trade, Levis, Quebec.

WILDER, ED.,
Secretary, Board of Commerce, Lexington, Kentucky.

BOWMAN, FRANK,
Secretary, Chamber of Commerce, Lexington, Missouri.

TUFTS, DOROTHY H.,
Secretary, Chamber of Commerce, Lexington, Virginia.

JAMES, WILLIAM G.,
President, Board of Trade, Lewiston, New York.

ELLIOTT, CYRUS M.,
Secretary, Business Men's Association, Lock Haven, Pennsylvania.

STREHLE, J. C.,
Secretary, Chamber of Commerce, Litchfield, Illinois.

WHITTEN, W. S.,
Secretary, Chamber of Commerce, Lincoln, Nebraska.

CAVALLI, A.,
Secretary, Chamber of Commerce, Long Branch, New Jersey.

HURLBURT, JOHN R.,
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MORROW, WILLIAM E.,
Secretary, Board of Trade, Louisville, Kentucky.

MILLER, A. A.,
Publicity Department, Long Beach, California.

WEBER, EARL S.,
Secretary, Chamber of Commerce, Kalamazoo, Michigan.

SMITH, WALLACE H.,
Secretary, Chamber of Commerce, Macon, Missouri.

COBB, WILTON E.,
Secretary, Chamber of Commerce, Macon, Georgia.

WELLS, HARRY E.,
Secretary, Chamber of Commerce, Madison, Indiana.

DAVIS, G. M.,
Secretary, Chamber of Commerce, Mankato, Minnesota.

PAISLEY, W. O.,
Secretary, Chamber of Commerce, Marion, Illinois.

THELEEN, G. D.,
Secretary, Chamber of Commerce, McKeesport, Pennsylvania.

SMITH, C. H.,
Secretary, Chamber of Commerce, McComb, Mississippi.

BARTON, JESSE M.,
Secretary, Board of Trade, Martins Ferry, Ohio.

EASTBURN, G. B.,
Secretary, Chamber of Commerce, Marshalltown, Iowa.

CONE, JOSEPH,
Secretary, Associated Business Men's Bureau, Marquette, Michigan.

GRAHAM, LYMAN L.,
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ROWE, B. C.,
Secretary, Chamber of Commerce, Moscow, Idaho.

RUCKVALE, WALTER,
Secretary, Chamber of Commerce, Medicine Hat, Alberta.

DESMOND, P. G.,
Secretary, Chamber of Commerce, Medford, Pennsylvania.

MILLIGAN, LESTER,
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DIVVERS, M. F.,
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ANUTA, MICHAEL J.,
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BURRUS, TEMPLE,
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MUNN, A. M.,
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GOULD, C. V.,
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PARKER, C. J. H.,
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FARGUHARSON, R.,
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BEUKEMA, J. C.,
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HATHAWAY, MARY,
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Secretary, Chamber of Commerce, Oskaloosa, Iowa.

ROBERTS, P. L.,
Secretary, Chamber of Commerce, Ottumwa, Iowa.

LITTLE, R. D.,
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WEAVER, IRMA H.,
Assistant Secretary, Chamber of Commerce, Paris, Illinois.

EVANS, W. W.,
Manager, Chamber of Commerce, Paris, Texas.

SNOW, LAWRENCE C.,
President, Chamber of Commerce, Park City, Utah.

WEEKS, GEORGE B.,
Secretary-Manager, Chamber of Commerce, Parsons, Kansas.

MILLER, A. J.,
Secretary, Board of Trade, Pembroke, Ontario.

HEADY, P. EMERSON,
President, Board of Commerce, Peekskill, New York.

LYMAN, ORMOND F.,
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STINSON, FRANK G.,
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HOLLENGA, DANIEL S.,
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GOSSARD, MRS. E.,
Secretary, Chamber of Commerce, Puyallup, Washington.

LAMSON, F. B.,
Secretary, Chamber of Commerce, Peru, Indiana.

SHIGLEY, P. H.,
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BEAUMONT, A. E.,
Secretary, Commercial Club, Pierre, South Dakota.

TAYLOR, CHARLES E.,
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LYON, S. CHESTER,
Secretary, Chamber of Commerce, Pittsfield, Massachusetts.

DALE, LAWRENCE L.,
Secretary, Chamber of Commerce, Plymouth, Massachusetts.

MINOR, L. O.,
Secretary, Chamber of Commerce, Plattsmouth, Nebraska.

FRICK, ADAM,
Manager, Chamber of Commerce, Portsmouth, Ohio.

CURROR, JOHN P.,
Secretary, Board of Trade, Prince Albert, Saskatchewan.

OLDEN, WALTER H.,
Secretary, Chamber of Commerce, Princeton, New Jersey.

PAIGE, J. M.,
Secretary, Chamber of Commerce, Pomona, California.

NIEMEYER, H. H.,
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DeBUSK, C. K.,
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HEWITSON, FRANCES M.,
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MOORHEAD, ALLYE,
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CHAPMAN, L. H.,
Secretary, Chamber of Commerce, Rockville, Connecticut.

FOSTER, W. H.,
Secretary, Chamber of Commerce, Rome, Georgia.

TYE, L. M.,
Secretary, Chamber of Commerce, Rutland, Vermont.

ARCHER, WALTER F.,
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MOOMAW, B. F.,
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DAVIS, RAY W.,
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McINTYRE, D. H.,
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MOUNTS, GEORGE H.,
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WILSON, C. E.,
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BREN, CHARLES H.,
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MOODY, L. S.,
Secretary, Chamber of Commerce, Salisbury, North Carolina.

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BRYAN, BALLINGER,
Secretary, Board of City Development, San Angelo, Texas.

MacDONOUGH, E. F.,
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MACK, R. H.,
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FOSTER, FRED LEWIS,
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CARSON, W. S.,
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FRANCE, GEORGE P.,
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FRASIER, H. H.,
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PRATT, C. F.,
Secretary, Association of Commerce, Sheboygan, Wisconsin.

PILVINSKY, ISADORE H.,
Secretary, Merchant's Association, Shenandoah, Pennsylvania.

LAWSHE, BENJAMIN B.,
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KILBORNE, HARRISON,
General Secretary, Chamber of Commerce, Sioux City, Iowa.

BURNS, J. E.,
Secretary, Board of Trade, Smiths Falls, Ontario.

VAN ORNUM, WINFIELD F.,
Secretary, Manufacturers and Merchants Association, Southbridge, Massachusetts.

BUCK, A. H.,
General Secretary, Chamber of Commerce, Bethlehem, Pennsylvania.

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DAHLING, H.,
City Clerk, South Milwaukee, Wisconsin.

HULL, W. D.,
Publicity Secretary, Chamber of Commerce, Spartanburg, South Carolina.

HAPGOOD, BENJAMIN A.,
General Secretary, Chamber of Commerce, Springfield, Massachusetts.

MILLER, R. B.,
President-Manager, Chamber of Commerce, Springfield, Ohio.

IMMAY, JOHN,
Secretary, Board of Trade, Springhill, Nova Scotia.

KINGSBURY, E. G.,
Secretary, Chamber of Commerce, Stanford, Connecticut.

HANES, CLARENCE O.,
Secretary, Chamber of Commerce, Steubenville, Ohio.

MURPHY, A. D.,
Secretary, Stillwater Association, Stillwater, Minnesota.

DUDLEY, A. S.,
Secretary-Manager, Chamber of Commerce, Stockton, California.

MALLOY, H. M.,
Town Clerk, Stony Point, New York.

DEACON, A. W.,
Secretary-Manager, Chamber of Commerce, Stratford, Ontario.

PARKER, HORACE R.,
Clerk of Selectmen, Swampscott, Massachusetts.

DAY, H. M.,
Manager, Convention of Publicity Bureau, Syracuse, New York.

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TURNER, THOMAS P.,
Secretary, Chamber of Commerce, Tallahassee, Florida.

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Superintendent of Public Schools, Tarentum, Pennsylvania.

SPENCER, W. A.,
Secretary, Chamber of Commerce, Temple, Texas.

PIERCE, R. I.,
General Secretary, Chamber of Commerce, Terre Haute, Indiana.

BIGGS, NAYLOR B.,
Secretary, Chamber of Commerce, Tiffin, Ohio.

GINN, A. O.,
Secretary, Commercial Club, Trenton, Missouri.

INGLIS, WILLIAM E.,
Secretary, Chamber of Commerce, Trinidad, Colorado.

GRANT, GEORGE M.,
Secretary, Chamber of Commerce, Troy, Alabama.

PATTON, DR. J. W. T.,
Secretary, Board of Trade, Truro, Nova Scotia.

BROWN, EARL,
Secretary, Chamber of Commerce, Topeka, Kansas.

CONDORN, A. H.,
Secretary, Chamber of Commerce, Tucson, Arizona.

CREAGER, B. G.,
Publicity Secretary, Chamber of Commerce, Tulsa, Oklahoma.

DWIGHT, CHARLES F.,
Secretary, Chamber of Commerce, Twin Falls, Idaho.

KEENE, SUSIE B.,
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KRAMP, E. E.,
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GAULT, LEWIS H.,
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Managing Secretary, Chamber of Commerce, Urbana, Illinois.

McDONALD, R. C.,
President, Chamber of Commerce, Urbana, Ohio.

JENCKS, E. D.,
Publicity Director, Saint Paul Association, Saint Paul, Minnesota.

ASHLEY, J. M.,
Secretary, Chamber of Commerce, Valdosta, Georgia.

STANWORTH, C. S.,
Secretary, Chamber of Commerce, Vallejo, California.

HIRSCHMAN, E. A.,
Secretary, Chamber of Commerce, York, Pennsylvania.

ECKLEY, OLIVE C.,
Secretary, Board of Commerce, Ypsilanti, Michigan.

ALEXANDER, L. W.,
Secretary, Chamber of Commerce, Yuma, Arizona.

ROWLEY, REZIA,
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RICHARDSON, W. E.,
Asssitant Secretary, Chamber of Commerce, Yakima, Washington.

MINER, W. N.,
Secretary, Chamber of Commerce, Waco, Texas.

OIEN, O. M.,
Secretary, Chamber of Commerce, Wahpeton, North Dakota.

MORTIMER, G. A.,
Chairman Publicity Committee, Board of Trade, Wallace, Idaho.

DAVIS, H. WINTER,
Representative, Chamber of Commerce, Wallingford, Connecticut.

COOK, EMORY C.,
Secretary, Chamber of Commerce, Warren, Pennsylvania.

CAMPBELL, H. R.,
Secretary, Chamber of Commerce, Washington, Pennsylvania.

HANSON, C. A.,
Secretary, Greater Waterloo Association, Waterloo, Iowa.

McGUIRE, WILLIAM P.,
Town Clerk, Watertown, Massachusetts.

SHIRLEY, W. M.,
Secretary, Chamber of Commerce, Watertown, South Dakota.

BOWMAN, NEAL F.,
Secretary, Board of Trade, Wooster, Ohio.

WALLACE, FLORENCE M.,
Secretary, Chamber of Commerce, Waterville, Maine.

HOFFMAN, B. A.,
Secretary, Association of Commerce, Waukesha, Wisconsin.

SCHRYVER, GEORGE W.,
Secretary, Board of Trade, Williamstown, Massachusetts.

HERONS, J. M.,
Secretary, Chamber of Commerce, Webb City, Missouri.

HOOVER, C. R.,
Vice-President, Wesleyan University, Middletown, Connecticut.

VANAUKEN, H. M.,
Secretary, Chamber of Commerce, Wichita, Kansas.

HAKES, B. D.,
Secretary, Chamber of Commerce, White Plains, New York.

CROMER, HORACE E.,
Secretary, Chamber of Commerce, Williamsburg, Virginia.

TURNER, E. A.,
Associate Secretary, Chamber of Commerce, Wilkes-Barre, Pennsylvania.

MOORE, LOUIS,
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ALLAN, A. S.,
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WILLIS, B. F.,
Secretary, Chamber of Commerce, Wellston, Ohio.

WILLIAMS, GEORGE L.,
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SULLIVAN, ELIZABETH M.,
Clerk, Chamber of Commerce, Waterbury, Massachusetts.

RAMBO, NATHAN R.,
Secretary, Chamber of Commerce, West Chester, Pennsylvania.

JACOBS, JACOB,
Secretary, Chamber of Commerce, West Haven, Connecticut.

GARLEY, FANNIE M.,
Secretary, Board of Commerce, Wyandotte, Michigan.

RITTER, WILLIAM T.,
Secretary, Chamber of Commerce, Winston-Salem, North Carolina.

BELL, ANDREW,
Secretary, Chamber of Commerce, Winchester, Virginia.

MILLER, JUSTUS,
Secretary, Chamber of Commerce, Windsor, Ontario.

SEATON, R. E.,
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O'BRIEN, W. S.,
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STINCHFIELD, O. M.,
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LEE, MARK,
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HUTCHINS, C. C.,
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LANGTRY, G. H.,
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CHITTY, F. C.,
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SHOCKLEY, ALBERT Y.,
Secretary, Chamber of Commerce, York, Nebraska.

SCHMIDT., J.,
Secretary, Chamber of Commerce, Yorktown, Virginia.

KEY TO PRONUNCIATION

VOWELS

ă (short), as in *hat, cat.*
ā (long), as in *ale, hate.*
ä (Italian), as in *car, mar.*
ȧ (short Italian), as in *fast, class.*
a̤ (broad), as in *all, fall.*
â (circumflex), as in *care, snare.*
ạ (short obscure), as in *final, spinal.*
ā̍ (long obscure), as in *surface.*
a̭ = ŏ, as in *was, what.*
ae = ē, as in *Caesar* (sounded as though they were *e* alone).

ĕ (short), as in *net, met.*
ē (long), as in *me, eve.*
ê (circumflex = â), as in *there.*
ẽ (tilde), as in *her.*
ẹ (short obscure), as in *patent.*
ē̍ (long obscure), as in *delay.*
ė = ĭ, as in *pretty.*

ĭ (short), as in *hit, bit.*
ī (long), as in *kite, mite.*
ĩ (tilde), as in *sir.*
ī̍ (long obscure), as in *idea.*

ŏ (short), as in *pop, hop.*
ō (long), as in *cone, bone.*
ô (circumflex = a̤), as in *for.*
ō̍ (long obscure), as in *hero.*
o͝o (short), as in *book, brook.*
o͞o (long), as in *moon, spoon.*
ọ = û, as in *word.*
o̤ = o͞o, as in *who.*
o̧ = o͝o, as in *wolf.*
ȯ = ŭ, as in *son.*

ŭ (short), as in *rut, cut.*
ū (long), as in *muse, fuse.*
û (circumflex), as in *turn, urn.*
ū̍ (long obscure), as in *unite.*

w is a vowel only after a vowel, when it forms the second element of certain diphthongs, as in *few, how.*
y̆ (short) = ĭ, as in *hymn.*
ȳ (long) = ī, as in *by, cry.*

CONSONANTS

c (hard) = k, as in *cat, cape.*
ç (cedilla) = s, as in *cell, façade.*
ḡ (hard), as in *dog, gave.*
ġ (soft), as in *gem, gentle.*

k for the German ch, as in *ich, Bach* (bäk).
ü for the German ü, as in *Blücher, Grünberg.*
ö for the German ö, as in *Göttingen, Görgey.*
n for the French n, as in *bon, Bréton* (brā̍-tō̍n′).

A

A, the first letter in the alphabet of all Indo-European languages. In many modern tongues it has but one sound, that equivalent to *a* in *father*. In English this symbol represents nine distinct sounds, as in *fate, senate, fare, mat, arm, ask, final, all,* and *what;* besides variations when used in digraphs, as *ea* in *meat, oa* in *float.* The letter *a* is used as a mark or symbol on account of its place at the beginning of the alphabet. In music it stands as the sixth note in the diatonic scale of C major; in logic it represents a universal affirmation; while in algebra it is used with other letters to denote known quantities.

AA, the name of about forty small rivers in Central and Northern Europe derived from the Celtic *Ach,* or Teutonic *Aa,* meaning flowing water. Among the most important of them are the following: I. A river of Holland, in North Brabant, which, passing Helmond, joins the Dommel at Bois-le-Duc. II. A river in Groningen, called Westerwolden Aa, which falls into the Dollart. III. A river in Overyssel, which, after uniting its waters with the Vecht, flows into the Zuyder Zee. IV. A river of Belgium, in the province of Antwerp, which flows into the Neethe.

AACHEN (ä'ken). See **Aix-la-Chapelle.**

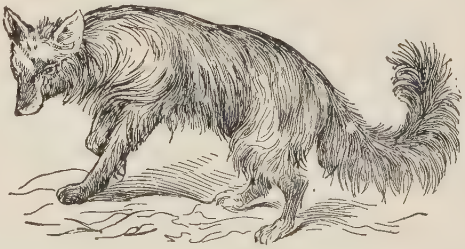
A1, a symbol used in Lloyd's "Register of British and Foreign Shipping" to designate vessels for the guidance of shippers and insurers. *A* designates the hull of the ship, and the figure 1 the efficiency of her stores, cables, and anchors. When these are insufficient for any reason, the figure 2 is united with *a,* and in like manner other figures and letters are used to constitute a complete nautical language.

AALBORG (a̤l'bôrk), a seaport and city of Denmark, province of Jutland, situated on the south shore of the Lymfiord, near its outlet into the Cattegat. It has a school of navigation, a large herring fishery, and manufactures of clothing and machinery. Direct communication is maintained by steam and packet boats with Copenhagen. The city library has 31,000 volumes. Population, 1906, 31,509; in 1921, 41,613.

AALI PASHA (ä'lee pä-shä'), **Mehemed Emin,** eminent statesman, born in Constantinople, Turkey, in 1815; died there Sept. 7, 1871. He was the son of a high priest, entered official service at an early age, and was secretary of legation in Turkey in 1834-36. In 1838 he was made secretary of legation in London, and was ambassador there in 1841-44. He was made pasha in 1846, and grand vizier in 1852, and became closely identified with the reforms of the sultans of the Ottoman Empire. In 1856 he represented the Porte at the Congress of Paris, and, after conducting the cause of Turkey with rare diplomacy and skill, signed the peace treaty that ended the Crimean War and settled the Rumanian question. In 1867 the sultan made a tour of Europe and Western Asia, and during his absence Aali Pasha was regent. Subsequently he suppressed the Cretan Rebellion, and also took effective measures in suppressing an uprising in Egypt. He is noted among the most eminent and efficient diplomats of Turkey in the last century.

AAR or **Aare** (är), a noted river in Switzerland, next to the Rhine and Rhone the largest stream in that country. It contains the Falls of Handeck, 200 feet high, and joins the Rhine at Coblentz after a course of 200 miles. From Lake Thun it is navigable for small craft.

AARD-VARK (ärd'värk), a burrowing and insectivorous mammal common to large parts of Africa. Three species are known, one each in Senegal, Nubia, and South Africa. These animals have affinities with the ant-eaters and armadillos, and are timid and harmless. Both natives and Europeans regard the flesh of value as food. The hams, salted and dried, are especially favored for eating in the summer season.

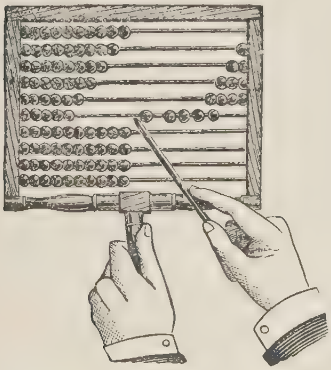

AARD-WOLF.

AARD-WOLF (ärd'wo͝olf), a carnivorous burrowing animal of South Africa. In size and habits it resembles the fox, and is allied to the African hyenas. It feeds on small mammals, white ants, and carrion. The aard-wolf is timid, spending most of the day in its burrow, but comes out at night in search of food.

AARHUS (ôr′ho͞os), a city of Denmark, capital of a district of the same name, 36 miles east of Viborg. It occupies a fine site on the Cattegat. The manufactures include clothing, earthenware, and ships. Electric and steam railways furnish communication with the leading cities of the country. It has a fine cathedral, several schools of higher learning, and a library of 200,000 volumes. Population, 1906, 55,193; in 1921, 74,256.

AARON (âr′on), the son of Amram, of the tribe of Levi, eldest brother of Moses, and first high priest of the Israelites. He was the spokesman of Moses at the court of Pharaoh, and assisted in rescuing the Jewish people from Egyptian bondage. His death occurred on Mount Hor at the age of 123 years. He was succeeded in the office of high priest by Eleazar, his eldest son.

ABACUS (ăb′ȧ-kŭs), a device used in kindergartens and primary schools to teach the elements of numbers. It consists of a rectangular frame, in which parallel wires are fastened to contain counters or beads. In architecture, the abacus is a square or oblong tablet on the crown of a column. In the new Ionic, Corinthian, and Roman styles the abacus has truncated angles and concave sides, while in the old Ionic, Doric, and Tuscan styles it is oblong.



ABACUS.

ABAD (ä-bäd′) **I.**, first Moorish king of Seville, died in 1042. His father, Ismael ben Abad, came from Emesa in Syria. Having gained the confidence of the King of Cordova, he procured for himself the office of chief cadi of Seville, and, by his intrigues and the support of the sheiks and viziers during the dissensions of the Kingdom of Cordova, he was enabled to render himself independent in 1023. On the massacre of the Ommyïades, he assumed the supreme title of king, and to give force to his pretensions, he proclaimed himself the legatee of Hashim al Mowaïad, the last of the Ommyïades, and by this means secured the affection and allegiance of his new subjects, who clung to the memory of their old sovereigns. He was succeeded by Abad II., his son, who died in 1069. The Abadite dynasty terminated with the son of the preceding, Abad III., in 1095.

ABALONE (ăb-ȧ-lō′nê), the name of several species of marine gastropods common to California, and found more or less widely distributed throughout the warmer seas. The name *abalone* is of Spanish origin, in California, but these animals are better known generally as ear-shells or sea-ears. They are allied with the limpets, and, like them, when frightened or at rest, withdraw the soft part under the shell, which is a broad spiral and has a richly colored mother-of-pearl, used in making buttons and ornaments. Large quantities are gathered by the Orientals on the coast of California for food, to be consumed locally, and for shipment to China and Japan.

ABATIS, or **Abattis,** in military strategy, a bulwark made of felled trees, in frequent use in rude mountain warfare. On emergency, the trees are laid lengthwise, with the branches pointed outwards to repel the invaders, while the trunks serve as a breastwork for the defendants.

ABBEY (ăb′bĭ), a monastery or society of persons of either sex, who seclude themselves from the world and lead a life devoted to religion. The name *abbey* is also applied to the monastic building or buildings. Men located in these establishments are called monks, and are governed by an abbot; while the women are called nuns, and are governed by an abbess.

ABBEY, Edwin Austin, artist, born in Philadelphia, Penn., April 1, 1852. At an early age he became fond of literature, especially of the study of poets and dramatists. After taking a course of instruction at the Pennsylvania Academy of Fine Arts, he devoted himself to producing book and magazine illustrations and in 1883 removed to London. He was a member of the New York Water-Color Society and similar organizations in England, and in 1898 was chosen a member of the Royal Academy in London. His work in pastel is noted for excellent coloring, and he takes rank as one of the most successful painters of his time. Among his best-known works are "Search for the Holy Grail." "Rose in October," "Lady Anne," and "Richard, Duke of Gloucester." He died Aug. 1, 1911.

ABBOT (ăb′bŭt), a prelate in the Roman Catholic Church, who governs a principal convent or monastery of the old religious orders. An abbot is solemnly consecrated by a bishop, though this is regarded as a merely ecclesiastical and not a sacramental rite. Abbots are allowed to use the mitre, pastoral cross, ring, and crozier, and to celebrate pontifical mass and are styled right reverend. Some of them, in former times, exercised a quasi-episcopal jurisdiction over a small district, and were allowed to confer tonsure and minor orders. During the Middle Ages many abbots, especially in England, were powerful feudal barons. In modern times they are simply superiors of religious houses. In ecclesiastical councils an abbot has a deliberative but not a decisive voice. Superiors of convents in the Greek Church are called *mandrites* and general abbots are known as *archimandrites.*

ABBOT, Ezra, biblical scholar, born at Jackson, Maine, April 28, 1819; died March 21, 1884. After attending Phillips Exeter Academy, he studied at Bowdoin College, where he graduated in 1840, and in 1856 was made assistant librarian at Harvard. In 1872 he became associated with the Cambridge Divinity School, as professor of New Testament criticism, and until his death he was active in that position. He became widely known as an exegetical and critical reviewer, and as a member of the American Committee assisted in the revision of the New Testament. He revised Schaff's "Companion to the New Testament" and published "Literature of the Doctrine of the Future Life."

ABBOT, Henry Larcom, soldier and engineer, born in Beverly, Mass., Aug. 13, 1831; died Oct. 2, 1927. He studied at the United States Military Academy, West Point, and served with distinction in the corps of engineers until his retirement in 1895. He was employed on the hydrographic survey of the delta of the Mississippi, and in 1861 was military engineer and took part in the Battle of Bull Run, where he was wounded, and later commanded the siege artillery around Richmond. He was brevetted Brigadier-General of the United States army at the close of the war, and was in command of the garrison of engineers at Willetts Point, New York. While holding that position he developed the torpedo, and later designed and constructed submarine mines. In 1897 he was made a member of the Technical Committee of the Panama Canal Company. Among his writings are "Siege Artillery in the Campaign against Richmond," and with General A. A. Humphreys he wrote "Physics and Hydraulics of the Mississippi."

ABBOTSFORD, the country home of Sir Walter Scott, on the Tweed River, in Scotland, built in the Scottish baronial style of architecture. Scott spent large sums of money in adorning the buildings and grounds, a circumstance that was the chief cause of his financial failure. The mansion passed to the only surviving daughter of Scott, and was long used as a Roman Catholic seminary for girls. The Abbotsford Club was organized at Edinburgh for publishing literature and history connected with the writings of Sir Walter Scott. This organization issued thirty-four volumes in the years 1835-64.

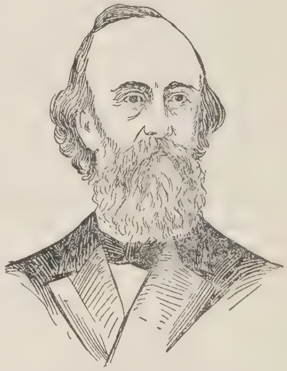
ABBOTT (ăb'bŭt), **Charles Conrad,** author and naturalist, born in Trenton, N. J., June 4, 1843. He graduated at the University of Pennsylvania in 1865, and soon after made a large collection of archaeological specimens, many of which are in the Peabody Museum, where he was assistant in 1876-89. His writings deal largely with biological and archaeological subjects. They include "The Stone Age in New Jersey," "A Naturalist's Rambles about Home," "The Freedom of the Fields," "The Birds about Us," "In Nature's Realm," and "Archaeological Explorations of the Valley of the Delaware."

ABBOTT, Jacob, author and educator, born at Hallowell, Maine, Nov. 14, 1803; died Oct. 31, 1879. His reputation rests largely on his "Young Christian," which went through many editions. Other publications include "Science for the Young," "The Franconia Stories," and "The Rollo Books."

ABBOTT, Sir John Joseph Caldwell, statesman, born at St. Andrews, Quebec, Mar. 12, 1821; died Oct. 30, 1893. He studied at McGill University, and was called to the bar in 1847. In 1867 he was chosen a member of the Dominion Parliament, where he had a long and useful career, and in 1891 succeeded Sir MacDonald as premier. He was knighted in 1892. For ten years he was dean of law at McGill University.

ABBOTT, John Stevens Cabot, historian, brother of Jacob Abbott, born at Brunswick, Maine, Sept. 18, 1805; died June 17, 1877. His writings include "Romance of Spanish History," "Lives of the Presidents," "Practical Christianity," "History of Napoleon I.," "The French Revolution of 1789," and "The History of Frederick the Great."

ABBOTT, Lyman, clergyman, son of Jacob Abbott, born in Roxbury, Mass., Dec. 3, 1835. He graduated from the University of the City of New York was ordained a minister of the Congregational Church, and in 1865 settled as pastor of the Congregational Church in Terre Haute, Ind. Subsequently he held appointments in New York City, and was editor of the *Illustrated Christian Weekly* in 1871-76. Later he became widely known as editor-in-chief of the *Outlook*. After 1899 he devoted himself entirely to literary and editorial work. His publications include "Jesus of Nazareth: His Life and Teachings," "Evolution of Christianity," "Results of Emancipation in the United States," "Old Testament Shadows of New Testament Truths," "Life and Literature of the Ancient Hebrews," and "The Rights of Man." He died Oct. 22, 1922.



LYMAN ABBOTT.

ABBREVIATIONS (ăb-brē-vĭ-ā'shŭns), the name applied to certain contractions employed in writing and printing to represent a letter or group of letters taken from a word or group of words, and used mainly to save time and space. The most common form of abbreviations is the substitution for a word of its initial letter, or of some arbitrary sign. Most of the sciences and arts have sets of signs, abbreviations, or symbols peculiar to themselves. It is quite impossible to give all the abbreviations now in general use, but below is a list of those considered most important:

A. B. Bachelor of Arts.
Abp. Archbishop.
A. D. *Anno Domini,* in the year of our Lord.
Admr. Administrator.
Ala. Alabama.
Alas. Alaska.
Alb. Alberta.
A. M. *Anno Mundi,* in the year of the world.
A. M. Master of Arts.
A. M. *ante meridian,* forenoon.
Ariz. Arizona.
Ark. Arkansas.
A. U. C. *Ab urbe condita,* meaning from the building of the City of Rome.
Aug. August.
Ave. Avenue.
Bart or Bt. Baronet.
B. C. Before Christ, British Columbia.
B. D. Bachelor of Divinity.
B. L. Bachelor of Laws.
Bp. Bishop.
B. V. Blessed Virgin.
Cal. California.
C. Consul, Caesar.
Can. Canada.
C. E. Canada East.
C. E. Civil engineer.
Cent. *Centum,* or hundred.
Chap. Chapter.
Co. Company or county.
Col. Colonel.
C. O. D. Cash on delivery.
Col. or Colo. Colorado.
C. R. *Civis Romanus.*
Cr. Creditor, credit.
C. S. A. Confederate States of America.
Ct. or Conn. Connecticut.
Cwt. Hundredweight.
D. Five hundred.
D. *Denarius,* a penny.
D. C. District of Columbia.
D. D. Doctor of Divinity.
Dec. December.
Del. Delaware.
D. F. *Fidei defensor,* defender of the faith.
D. G. *Dei Gratia,* by the grace of God.
Do. *Ditto,* the same.
Dr. Doctor, debtor.
D. V. *Deo volente,* God willing.
Dwt. Pennyweight.
E. East.
E. G. *Exempli gratia,* for example.
Esq. Esquire.
Exr. Executor.
Feb. or Febr. February.
F. G. S Fellow of the Geological Society.
F. O. B. Free on board.
F. R. S. Fellow of the Royal Society.
Fla. Florida.
Frank. Franklin.
Ga. Georgia.
Gal. Gallon.
G. A. R. Grand Army of the Republic.
G. B. Great Britain.
Gen. General.
G. C. B. Knight of the Grand Cross of the Bath.
Gov. Governor.
Hhd. Hogshead.
H. I. Hawaiian Islands.
H. M. S. His Majesty's ship.
Hon. Honorable.
H. R. H. His or Her Royal Highness.
Ia. Iowa.
Ib. or *Ibid, Ibidem,* in the same place.
Id. *Idem,* the same.
Ida. Idaho.
I. e. *Id est,* that is.
I. H. S. *Jesus Hominum Salvator,* Jesus the Saviour of mankind.
Ill. Illinois.
Incog. *Incognito,* unknown.
Ind. Index, Indiana.
Inst. Instant, of the present month.
Jan. January.
J. P. Justice of the Peace.
Jr. Junior.
Kans. Kansas.
K. B. Knight of the Bath.
Kew. Kewatin.
K. G. Knight of the Garter.
Kt. Knight.
Ky. Kentucky.
La. Louisiana.
Lab. Labrador.
Lat. Latitude.
L. or lib. *Libra,* a pound; or *liber,* a book.
L. I. Long Island.
Lb. *Libra,* pound.
Lieut. Lieutenant.
LL. D. *Legum doctor,* Doctor of Laws.
Lon. or Long. Longitude.
L. S. *Locus Sigilli,* place of the seal.
M. *Mlle,* or a thousand.
M. A. Master of Arts.
Mack. Mackenzie.
Man. Manitoba.
Mar. March.
Mass. Massachusetts.
M. C. Member of Congress.
M. D. *Medicinae doctor,* doctor of medicine.
Md. Maryland.
Me. Maine.
Messrs. *Messieurs,* gentlemen.
Mex. Mexico, or Mexican.
Mich. Michigan.
Minn. Minnesota.
Miss. Mississippi.
Mo. Missouri.
Mon. or Mont. Montana.
M. P. Member of Parliament.
Ms. Manuscript. MSS. Manuscripts.
N. North, note, noon.
N. A. North America.
N. B. *Nota bene,* mark well.
N. B. New Brunswick.
N. C. North Carolina.
N. D. No date, North Dakota.
N. E. New England.
Neb. Nebr. Nebraska.
Nev. Nevada.
Nfld. Newfoundland.
Nem. con. *Nemine contradicente,* unanimously.
N. H. New Hampshire.
N. J. New Jersey.
N. M. New Mexico.
No. Number.
Nov. November
N. P. Notary Public.
N. S. New style, Nova Scotia.
N. Y. New York.
Ob. *Obit,* died.
O. Ohio.
Oct. October.
Okla. Oklahoma.
Ont. Ontario.
Or. or Ore. Oregon.
O. S. Old style.
Ox. Oxon, of Oxford.
Oz. Ounce.
Pa. or Penn. Pennsylvania.
Parl. Parliament.
Per ann. By the year.
Per cent. *Per centum,* by the hundred.
P. I. Philippine Islands.
Pl. Plural.
P. M. *Post meridian,* afternoon.
P. M. Postmaster.
P. O. Post office.
Prof. Professor.
Pro tem. *Pro tempore,* temporarily.
Prox. Next month.
P. S. Postscript.
Q. Question.
Que. Quebec.
Qy. *Quaere,* query.
Q. C. Queen's Counsel.
Q. E. D. *Quod erat demonstrandum,* which was to be demonstrated.
Q. S. *Quantum sufficit,* a sufficient quantity.
Q. V. *Quod vide,* which see.
R. A. Royal Academy, Royal Artillery.
R. E. Royal Engineer.
Rev. Reverend.
R. I. Rhode Island.
R. N. Royal Navy
Rt. Hon. Right Honorable.
S. South, of *solidus,* a shilling.
S. A. South America.
Sask. Saskatchewan.
S. C. South Carolina.
S. D South Dakota.
Sec. Secretary.
Sept. September.
S. P. Q. R. *Senatus Populusque Romanus.*
SS. *Scilicet,* to wit, namely.
St. Saint, street.
Tenn. Tennessee.
Tex. Texas.
U. C. *Urbs Condita,* year of Rome.
Ult. *Ultimo,* last month.
Ung. Ungava.
U. S. United States.
U. S. A. United States Army.
U. S. N. United States Navy.
Ut. Utah.
V. or Vs. Against.
Va. Virginia.
Viz. *Videlicet,* namely.
V. S. Veterinary surgeon.
Vt. Vermont.
W. West.
Wash. Washington.
Wis. Wisconsin.
W. Va. West Virginia.
Wy. Wyoming.
Xmas. Christmas.
Yr. Your, year.
Yuk. Yukon.
&, etc., and &c. *Et cetera,* and so forth.
Y. M. C. A. Young Men's Christian Association.

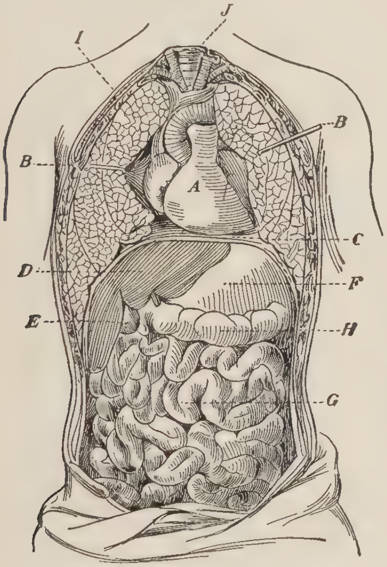
ABD-EL-KADIR (äbd-e̮l-kä'di̮r), celebrated prince or emir of the Arabs in Algeria, born in Mascara, in the early part of 1807. He acquired a reputation for wisdom and piety at an early age, and developed extraordinary skill in horsemanship and muscular exercises. At the age of twenty-four years he was chosen emir of Mascara, and later commander of the united tribes to quash the French power in Africa. At first successful, temporary peace was concluded in 1834, but war broke out again five years later, and was waged with great vigor for several years. In 1841 the French army numbered about 100,000 men, under Marshal Bugeaud, and, after determined resistance, Abd-el-Kadir surrendered to the Duc d'Aumale on Dec. 22, 1847, with the assurance that he would be allowed to retire to Alexandria. However, he was taken to France and imprisoned at Toulon, but was promptly liberated by Louis Napoleon in 1852. His death occurred at Damascus, Syria, on May 26, 1883.

ABDICATION (ăb-dĭ-kā'shŭn), the act whereby an office or dignity is given up before the expiration of the term of incumbency, and may be either voluntary or compulsory. The abdication of Diocletian and Maximian are the best known cases in antiquity. In absolute monarchies despotic sovereigns may abdicate at any time, but in a limited monarchy or independent state it usually requires the consent of the legislative branch of government. The following is a list of important abdications occurring in the last century:

Charles Emmanuel IV. of Sardinia.........	June	4, 1802
Charles IV. of Spain.........................	March	19, 1808
Joseph Bonaparte of Naples.................	June	6, 1808
Gustavus IV. of Sweden.....................	March	29, 1809

Napoleon I. of France	April 14, 1814 June 22, 1815
Victor Emmanuel of Sardinia	March 13, 1821
Charles X. of France	August 2, 1830
William I. of Holland	Oct. 7, 1840
Louis Philippe of France	Feb. 24, 1848
Ferdinand of Austria	Dec. 2, 1848
Charles Albert of Sardinia	March 23, 1849
Isabella II. of Spain	June 25, 1870
Abdul-Aziz of Turkey	May 30, 1876
William of Albania	Sept 2, 1914
Nicholas II. of Russia	March 15, 1917
William II. of Germany	Nov. 9, 1918

ABDOMEN (ăb-dō'mĕn), in anatomy, the lower part of the trunk of the body; the trunk being divided by the diaphragm into two cavities—the upper being the thorax, and the lower the abdomen. It is walled in by broad muscles, fasciae and skin, except behind, where the projecting processes and the bodies of the five lumbar vertebrae assist, above by the walled diaphragm, and below by the bones of the pelvis. The capacity of the abdomen varies according to the nature of its walls. It is lined by a clothed serous sac, the *peritoneum,* whose visceral layer is reflected over the contained viscera, forming a thin exterior coat. In entomology, the abdomen is the last of the three parts into which the body of an insect is divided. It is composed of a number of rings or segments, frequently nine, more or less distinct from each other. In many insects the last part of the abdomen contains pincers, stings, borers, etc.



THORAX AND ABDOMEN.

A, the heart; *B,* the lungs drawn aside to show the internal organs; *C,* the diaphragm; *D,* the liver; *E,* the gall cyst; *F,* the stomach; *G,* the small intestines; *H,* the transverse colon; *I,* muscles of the chest; *J,* trachea.

ABDUL-AZIZ (äb-do͝ol-ä-zēz'), Sultan of Turkey, born Feb. 9, 1830; died June 3, 1876. In June, 1861, he succeeded his brother, Abdul-Medjid, thirty-first Sultan of the Ottoman Empire, to the throne, and made professions of liberality in furthering governmental reforms, but soon became unpopular by levying heavy taxes to beautify the capital and enlarge the army. The important events of his reign include an insurrection in Crete, the struggle of Servia and Rumania for independence, and cruel treatment of the Christians in the Balkan region. Treaties were concluded with France and England, and his policy with Russia caused revolts in Bosnia, Bulgaria, and Herzegovina. He was compelled to abdicate in May, 1876, and four days later died by his own hand, or was assassinated.

ABDUL-HAMID (-hȧ-mēd'), **II.,** Sultan of Turkey, born Sept. 22, 1842; died Feb. 10, 1918. In 1876 he succeeded Murad V. as the thirty-fourth Sultan of the Ottoman Empire. His accession to the throne came at a time of much political dissatisfaction in Turkey; Servia had declared war against Turkey, and the insurrection in Bosnia and Herzegovina had grown formidable. Russia, to protect its interests in the Balkan region, declared war in 1877, and its army advanced victoriously almost to Constantinople. By the Treaty of Berlin, Turkey lost all claim to Servia, Bosnia, Bulgaria, Rumania, Montenegro, and Herzegovina, and escaped dismemberment only because of European jealousy of Russia. The Sultan was obligated to introduce certain reforms in the Christian provinces, but they were not carried out in good faith. Turkish misgovernment caused a revolt in Crete in 1897, which finally resulted in a war with Greece, but Greece was defeated and forced to pay an indemnity. Abdul-Hamid II. gave support to orthodox Mohammedanism and pretended to the actual headship of Islam. He granted a constitution in 1908, but was deposed in 1909 and was succeeded by Mohammed V. (born Nov. 3, 1844).

ABDUL-MEDJID (-me-jēd'), Sultan of Turkey, born May 6, 1822; died June 25, 1861. In 1839 he succeeded his father, Mahmud II., at the time when Mehemet Ali, Viceroy of Egypt, threatened the Ottoman Empire. The Egyptians defeated the Turks in the Battle of Nisib in 1839 and began an advance on Constantinople, but the European powers intervened and restricted the power of Mehemet Ali to Egypt. In 1846 he established a system of free public schools and founded a number of colleges of medicine and agriculture. The Crimean War made many difficulties for his government, but his decrees for greater political rights and religious equality show him to have been more progressive than his nation.

ABD-UR-RAHMAN (äbd'ŭr-rä-män), Ameer of Afghanistan, born in 1830; died Oct. 3, 1901. He was the eldest son of Mohammed Afdal Khan and the grandson of Dost Mohammed, and became a refugee in Russian territory in 1869, because he had supported the pretensions of his father against his uncle, Shere Ali. After the death of Shere Ali, in 1879, his son Yakub became ameer, but he was driven from the throne by the British within a year, and

Abd-ur-Rahman was recognized by the leading chiefs as supreme commander. His administration was successful and vigorous, on account of which the tribes of the Hindu-Kush mountain district became subjugated. The British government made him grand commander of the Star of India.

ABEL (ā'bĕl), the individual mentioned in the Book of Genesis as the second son of Adam, and who was by occupation a shepherd. His brother Cain slew him while under the influence of jealousy, because his offering was rejected by Jehovah, while Abel's sacrifice of the firstling of the flock was accepted. In the Epistle to the Hebrews his offering is spoken of in these words: "By faith Abel offered unto God a more excellent sacrifice than Cain." The Christian church in all ages has regarded Abel as a type of innocence and faith.

ABÉLARD (ăb'e-lärd), **Pierre,** scholar, theologian and philosopher, born near Nantes, France, in 1079; died April 21, 1142. His great desire for knowledge and scholastic logic caused him to resign his parental inheritance to his brothers, and he was thus enabled to begin a course of study in Paris. Owing to extraordinary natural ability and devotion to research, he made remarkable progress, and ultimately eclipsed his teachers. In 1101 he established a school of natural philosophy near Paris to which were attracted students from many adjacent cities. Many of his students afterward rose to eminence, among them Pope Celestine II., Peter Lombard, and Arnold of Brescia. While in the height of his successes, and surrounded by students of all countries, drawn by the fame of his teaching, in which acuteness of thought was relieved by simplicity and grace of exposition, he became infatuated with one of his pupils, Héloise, the beautiful niece of Canon Fulbert, then seventeen years of age. This terminated unfortunately, and Abélard entered an abbey at Saint Denis as a monk, and induced Héloise to enter as a nun at Argenteuil. He soon after began to lecture on religious subjects, but was persecuted by the hatred of the monks. His death occurred in the abbey of Saint Marcel. Héloise had him buried at Paraclete with the wish that some time she would be interred by his side. She survived him twenty years. In judging of Abélard's merits we are to look to the influence that his great power of public disputation enabled him to exercise over public thought, rather than to his writings. His doctrine as well as character gave marked offense to the people of his time, a circumstance to be expected on account of the general low ebb of educational interest. He is generally credited with the invention of a new system of philosophy midway between realism and nominalism. The first collection of his writings was made by François Amboise and published in Paris in 1616, but his complete works were not published until in 1849-59.

ABENCERRAGES (ȧ-bĕn'sē-rȧj-ĕz), the name of a distinguished Moorish family, whose mortal feud with the Zegris, another noble family of Granada, contributed to the fall of the Granadian monarchy. The quarrel originated in the varying fortunes of Mohammed VII. of Granada, who was alternately a monarch and an exile, and whose cause the Abencerrages espoused with unswerving fidelity. It is told that one of the youth of the Abencerrages, having loved a lady of the royal house, was climbing to her window, when he was discovered and betrayed, and the king, in revenge for the outrage on the sanctity of his harem, shut up the whole Abencerrage family in a tower, and, letting loose the fury of their hereditary enemies, had them butchered in cold blood. This tragical tale has been the foundation of both Spanish and French dramas.

ABEN EZRA (ä'bĕn-ĕz'-rȧ), **Abraham ben Mair ben Ezra,** born in 1093, died at Rhodes Jan. 23, 1167. He was one of the most esteemed biblical commentators among the Jews of the 12th century, and was distinguished as a physician, mathematician, and philologist. He traveled extensively, and his writings were numerous. His "Commentaries on the Old Testament" has been used by subsequent Hebrew scholars.

ABERCROMBIE (ăb'er-krŭm-bĭ), **James,** general, born in Scotland in 1706; died April 28, 1781. He commanded in America during the French and Indian War, in 1758. In that year he made a signal failure in an attack on Ticonderoga in July, which place he attempted to capture with a force of 15,000 men, but was repulsed with a loss of 2,000 killed and wounded. On returning to England, he became deputy governor of Stirling Castle and a member of Parliament. Consult Parkman's "Montcalm and Wolfe."

ABERDEEN (ăb-er-deen'), the chief seaport city in the north of Scotland, county seat of Aberdeen County, on the North Sea, at the mouth of the Dee River. The city is conveniently situated on a number of important railroads, has extensive wharfage, and a large export and import trade. There are manufactures of cordage, linen and woolen goods, chemicals, ships, machinery, stone and iron wares, paper, and spirituous liquors. The streets are substantially paved, and improved with gas and electric lighting, sewerage, and extensive street railways. Union Street is its main thoroughfare and its numerous notable buildings cause it to rank as one of the finest streets of Europe. Among the chief buildings of the city are the University of Aberdeen, the custom-house, the Royal Infirmary, and numerous hospitals, schools, and churches. The extensive use of granite in the larger buildings has caused it to be known as the "Granite City." It was chartered in 1179, and has long ranked as a city of great wealth, educational progress, and commercial importance. Population, 1920, 167,685.

ABERDEEN, a city of South Dakota, county seat of Brown county, 120 miles northeast of Pierre, on the Chicago and Northwestern, the Great Northern, the Chicago, Milwaukee and Saint Paul, and other railroads. It is surrounded by a fertile agricultural country, and is an important shipping point for cereals and live stock. There are manufactures of farming implements and a considerable jobbing trade. It has a fine high school, three hospitals, two public parks, and the Northern Normal and Industrial School. The city was incorporated in 1882. Population, 1900, 4,087; in 1920, 14,537; 1925, 15,531.

ABERDEEN, a city in Grays Harbor County, Wash., on the Northern Pacific and other railroads. The chief buildings include the city hall, public library, and high school. It has a large shipping trade. Population, 1925, 21,471.

ABERDEEN, John Campbell Gordon, seventh Earl of, statesman, born Aug. 3, 1847. He was educated at University College, Oxford, and in 1870 succeeded to the title and estates on the death of his brother. In politics he was in sympathy with the Conservative party until 1880, when he became a supporter of Gladstone, and in 1886 was appointed Lord Lieutenant of Ireland. For five years, from 1893 until 1898, he was Governor-General of Canada.

ABERNETHY (ăb′ẽr-nē̇-thĭ), **John,** eminent surgeon, born in Scotland in 1764; died in Enfield, England, April 18, 1831. He was a pupil of the celebrated John Hunter, an eminent surgeon. He ranks high as a lecturer on anatomy and surgery, and laid the foundation of a school of surgery. The most important of his works, "Observation on the Constitutional Origin and Treatment of Local Diseases," was published in 1806. His "Lectures on the Theory and Practice of Surgery" was published in 1830.

ABERRATION (ăb-ẽr-rā′shŭn), in optics, the wandering of rays of light from the normal path, caused when reflected from curved mirrors, or made to pass through curved lenses, which form portions of a sphere instead of portions of a parabola. This is due to the unequal refraction of the lenses of the rays of light and renders images formed about the edges in some degree undefined. In astronomy, aberration is the difference between the observed position of a heavenly body and the one really occupied, the result of the combined effect of the motion of the eye of the observer and that of the light caused by the annual or diurnal motion of the earth, or of the motion of light and that of the body from which the light proceeds. The aberration of light, discovered by James Bradley (1693-1762), an English astronomer, is proof of the motion of light and of the earth's motion.

ABIGAIL (ăb′ĭ-gāl), the wife of Nabal, a rich man of Carmel, and subsequently the wife of King David. She was famed for her beauty and discretion, and gave food to David at the time of his flight from Saul. She became the wife of David after the death of Nabal, was captured during a raid by the Amalekites, but David recovered her. She was the mother of Chileab, a son of David. Her name is frequently applied to any female servant.

ABINGTON (ăb′ing-tun), a manufacturing town of Plymouth County, Mass, twenty miles southeast of Boston. The principal manufactures are boots and shoes. It has a municipal waterworks plant, several fine schools and churches, and good railroad facilities by the New York, New Haven, and Hartford Railway. The first settlement in its vicinity was made in 1680. Population, 1905, 5,081.; in 1925, 5,882.

ABNER (ăb′nẽr), the son of Ner and cousin of Saul, and the general of his troops. He was greatly loved by Saul, and faithful to him until his death, and then transferred his allegiance to Ishbosheth, Saul's son, to whom he preserved the throne of Israel for seven years against the rival claims of David, who kept his state of Judah at Hebron. At length Abner went over to the cause of David, but the aid he might have rendered to that king was cut off by his sudden death at the hand of Joab, David's captain, who was probably moved with jealousy at the influence of so powerful a rival for the king's favor, though Joab alleged the object of the assassination was to avenge the death of his brother Asahel. David was deeply afflicted at the death of Abner, and lamented him in a sort of funeral dirge, (2. Sam. iii.).

ABO (ō′bo͞o), a city of Russian Finland, built on both sides of the Aurajoki, not far from where it flows into the Gulf of Bothnia. It was founded in 1157 by the Swedes, and was the capital of Finland until 1819. The bishopric established here in the 13th century was raised in 1817 by the Russian government to an archbishopric. In 1827 the greater part of the city was destroyed by fire, including the university buildings and the library containing 40,000 volumes. The university was rebuilt in Helsingfors, the new capital. It is important as a shipbuilding port and has extensive cotton mills and sugar refineries. Population, 1921, 39,238.

ABOLITIONISTS (ăb-ȯ-lĭsh′ŭn-ĭsts), a political party in the United States, whose object was to secure the immediate abolition of slavery. Early in the 18th century a strong sentiment became widespread throughout the country in favor of the abolition of all slaves. As early as the close of the Revolutionary War a number of Northern states provided for immediate or gradual emancipation. Before the end of the century many abolition societies were founded. The movement secured new impetus when William Lloyd Garrison and his followers in 1829 demanded the immediate and total abolition of slavery throughout the country. Other influential advocates of abolition, besides Garrison, include Wendell Phillips, John G. Whittier, Edmond Quincy, Samuel J. May, and William Jay. The sentiment grew in popularity until the movement ended Jan. 1, 1863, when Lincoln emancipated the slaves.

ABOMEY (ăb-ô-mā′), a town in West Africa, in Dahomey, about sixty miles from the coast of Guinea. Population, 21,000.

ABOUKIR (ä-bōō-kēr′), or **Abukir,** a village in Egypt, thirteen miles northeast of Alexandria, near the site of the ancient Canopus. Its harbor is spacious, and on its western side is a castle of considerable strength. In 1798 Aboukir Bay was the scene of the famous Battle of the Nile, in which an English fleet under Nelson defeated a French fleet commanded by De Bruycs, thus destroying the naval power of France in the Mediterranean. Napoleon defeated the Turks under Mustapha near Aboukir in 1799, and Sir Ralph Abercromby (1734-1801) repulsed the French in its vicinity in 1801, the engagement being known as the Battle of Alexandria.

ABOUT (à-bōō′), **Edmond,** novelist, born at Dieuze, France, Feb. 14, 1828; died Jan. 17, 1885. Among his chief works are "The Notary's Nose," "The Roman Question," and "The Man with the Broken Ear."

ABRACADABRA (ăb-rà-cà-dăb′rà), a word used as a magical formula to invoke the assistance of good spirits against all evils and sickness. It was probably first used by the Persians, who inscribed it in the form of an inverted triangle on gems that formed a class of Abraxas stones. Worn on the bosom for nine days and then destroyed secretly, it was supposed to cure fevers and other ailments. Severus Sammonicus, a Gnostic physician, recommended its use as early as 200 A. D.

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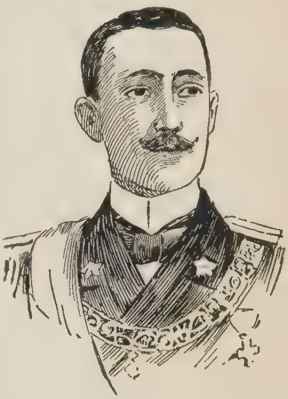
ABRAHAM (ā′brà-hăm), the first of the Hebrew patriarchs, husband of Sarah, born at Ur, in Chaldea, about the year 2000 B. C. He was the greatest of the Hebrew patriarchs, the father of Isaac and Ishmael, and these two sons were the progenitors of the Hebrews and Arabs, respectively. Tradition ascribes to Abraham a knowledge of philosophy and astronomy, ability to interpret dreams, and the invention of alphabetic writing. The Mohammedans reckon him among the prophets, and attribute to him the building of the sacred Kaaba at Mecca.

ABRAMS, Albert, physician, born at San Francisco, Calif., Dec. 8, 1863; died Jan. 13, 1924. He studied in the universities of Heidelberg, London, Berlin, Vienna and Paris, and became professor of pathology, teaching at Cooper Medical College and other institutions. His works on medicine and medical science are very numerous, including "Normal Clinical Diagnosis," "Diseases of the Lungs," "Spinal Therapeutics," etc.

ABRASIVE (ăb-rā′sĭv), the name applied to any natural or artificial material employed in the art of grinding and polishing. In modern manufacturing the use of natural abrasives has given way to a large extent to the artificial substances in cutting and polishing stone, wood, and metal. To the former class belong sand, emery, quartz, garnet, and corundum. Sand is employed extensively in the sandblast and in the form of sandpaper for cleaning wood and ironwork, while emery is used in the form of powder to polish stones and plate glass. Emery wheels have faces coated with emery or are solid emery stone, and emery paper or emery cloth is paper or cloth coated with powdered emery. Quartz is used for buhrstones, and garnet, which, by its cleavage, presents new cutting edges instead of wearing smooth, is an excellent material for polishing wood and leather. Corundum is mined extensively in North Carolina and is made into an abrasive powder by crushing and grinding. Carborundum, pumice, tripoli, and crushed steel are other abrasives. Whetstones and grindstones are cut from natural rocks, while pumice is a volcanic ash and is used for polishing and scouring.


LUIGI AMEDEO ABRUZZI.

ABRUZZI (a-brōōt′sē), **Luigi Amedeo,** traveler and explorer, born in Madrid, Spain, Jan. 29, 1873. He studied at the naval college in Leghorn and became captain in the navy of Italy. In 1897 he made an ascent of Mount Saint Elias, on the border between Alaska and Yukon. Two years later he made his famous voyage toward the North Pole, reaching, in 1900, the highest latitude attained up to that time, 86° 33′, and in September returned to Christiania, Norway. In this expedition he explored part of the northern boundary of Franz-Josef Land. He published "On the Polar Star in the Arctic Sea" and "The Ascent of Mount Saint Elias." In 1915 he was placed in general command of the fleet of Italy.

ABSALOM (ăb′sà-lom), the third son of David, King of Israel, and distinguished for his manly beauty and unjust rebellion against his father. He first won the affection of the people by popular acts, and then instigated a powerful rebellion against the government with the view to overthrowing it and making himself king. The rebels were defeated in a battle in the forest of Ephraim, and in the flight Absalom, while riding under a tree, was caught in its branches and held suspended by his hair. Joab, the commander of David's army, found him in this position, and, contrary to the king's expressed orders that he should be spared, thrust him to death with his spear. David's grief at the loss of his son was excessive and touching.

ABSINTH (ăb-sĭnth'), a liquor prepared from the leaves and the flowering tops of various species of wormwood with roots of sweet flags, angelica, the leaves of the dittany of Crete, star anise fruit, and other aromatics, usually by being steeped in alcohol. While the beverage is pleasant to the taste, it is quite harmful to the system and dangerous to health. It is manufactured in Switzerland and France, but is consumed chiefly in the latter country. Its introduction into France dates from the Algerian War of 1844-47, when the soldiers returning to France, who had acquired the habit of drinking it in Algeria, caused the custom to become extensive, but it was legally restricted after 1914.

ABSOLUTION (ăb-sȯ-lū'shŭn), the pardon and remission of the sins of a penitent. In the Roman Catholic Church the priest pronounces absolution in *foro externo,* the remission of certain ecclesiastical penalties, or absolution in *foro interno,* the remission where mortal and venial sin is remitted. The Augsburg Confession of the Lutheran Church retained absolution as the individualization of the promise of Scripture to the penitent rightly disposed. In the Episcopal Church absolution is a formula of publicly praying for, or declaring, the remission of the sins of the penitent, and in visiting the sick pardon from sin is pronounced after private confession.

ABSOLUTISM (ăb'sȯ-lū-tiz'm), a form of government in which the executive power is vested in a ruler who is not controlled by any constitution or law. It was the prevailing government of ancient time, and reached its highest development in Europe after the downfall of the feudal system. Louis XIV. of France was its most arbitrary modern champion, and declared, "I am the state." Japan and Russia a few years ago changed to representative governments. Turkey, though usually classed as an absolute government, has had a constitution since 1908.

ABSORBENTS (ăb-sôrb'ents), the vessels by which the nutritive elements of food are carried into the circulation of plants and animals. In plants this function is carried on by the extremities of the roots, and in vertebrate animals it depends chiefly upon the skin, lacteals, and lymphatics.

ABSORPTION (ăb-sôrp'shŭn), in physiology, the act of taking up material suitable for nourishment by means of tissues. The nutritious elements of foods are gathered by a system of minute vessels called absorbents, and are carried into the circulation. The vessels consist of two main classes, named, respectively, lacteals and lymphatics, but absorption is carried on to some extent by the skin and blood vessels. In plants, absorption is carried on chiefly by the roots.

ABSTRACTION (ăb-străk'shŭn), the mental act of withdrawing the consciousness from one or more subjects with a view to concentrating it on some definite one, or the act of the mind by which a part of the objects presented for observation are disregarded in order to concentrate the attention on the remainder.

ABT (äpt), **Franz,** poet and musician, born at Eilenburg, Germany, Dec. 22, 1819; died March 31, 1885. He studied at Leipzig, where he met Mendelssohn and was induced to give his attention to the study of music. In 1841 he became musician in the court theater at Bernburg, and later accepted a similar position at Zurich, where he became popular as a composer and teacher. He was made musical director at the court theater at Brunswick in 1852, and in 1872 toured Canada and the United States. In 1881 he was given a pension and subsequently devoted much of his time to the work of writing songs, of which he published about 600. His best-known song is "When the Swallows Homeward Fly." Many of his songs have been translated and are widely known. Those wortny of special mention are "Sleep Well, Sweet Angel," "Good night, My Child," and "When I am Near Thee."

ABU-BEKR (ä-bo͞o-bĕk″r), first successor of Mohammed, born in 570; died in 634. He was the father-in-law of Mohammed, and his name, meaning "Father of the Virgin," was given to him in allusion to his daughter Ayesha, the Prophet's favorite wife. As a military leader he successfully opposed the Romans under Emperor Heraclius, and was energetic in propagating the new faith. He collected the writings and oral doctrines of Mohammed and published the Koran. Ali, the cousin of Mohammed, contested his right to the succession and caused the Mohammedans to become divided into the two sects known as Shiites and Sunnites, the latter being the adherents to the teaching of Abu-Bekr.

ABU TEMAM (a'bo͞o tê-mäm'), celebrated as the greatest of all Arabic poets, born about 807; died in 846. His poems are said to have procured him many thousand pieces of gold, and the Arabs say of him that "no one could ever die whose name had been praised in the verses of Abu Temam." He was the compiler of three collections of select pieces of Eastern poetry, the most esteemed of which, called the "Hamasa," is praised by Sir William Jones.

ABUTILON (ȧ-bū'tĭ-lŏn), a genus of plants of the mallow family, widely distributed in warm climates, and including about seventy species. Some species are cultivated for their bell-shaped flowers. The common abutilon is a weed in many parts of the United States, where it is known as velvet-leaf.

ABYDOS (ȧ-bī'dōs), an ancient city of Asia Minor, located at the narrowest part of the Hellespont. It is noted as the scene of a number of historic events, among them those of

480 B. C., when Xerxes crossed the straits on a great bridge of boats at the time of his invasion of Greece. Alexander the Great crossed at the same place when he marched into Asia in the year 334 B. C. Ancient writers credit Leander with swimming nightly from Abydos to Sestos, a distance of about a mile, to see his beloved Hero—a feat in swimming accomplished by Lord Byron to verify the story of Leander. Abydos is also the name applied to an ancient city of Upper Egypt, situated a short distance west of the Nile, the site of which is now marked by ruins and tombs. It is famous for the palace of Memnon and the temple of Osiris. In 1818 and in 1864 various collections of the famous Abydos tablets were discovered in its vicinity. They contain a list of the successors of Rameses the Great, including the kings of the first three dynasties of Egypt, beginning with Menes.

ABYSSINIA (ăb-ĭs-sĭn'ĭ-ȧ), an independent political division of Eastern Africa, located between the Red Sea and the Blue Nile. Its boundary is formed by the Italian Colony of Eritrea on the northeast, a region known as Danakil on the east, British East Africa on the south, Egyptian Sudan on the west, and Nubia on the northwest. It is divided into the four provinces of Shoa, Tigré, Gojam, and Amhara, but the exact boundaries are not well defined. The four provinces, including the outlying dependencies of Enarea, Harrar, and Kaffa, have an area estimated at 350,000 square miles, and a population of 7,500,000. The seat of government is at Addis Abeba.

DESCRIPTION. Abyssinia may be described as an elevated plateau, its altitude being about 8,000 feet. Numerous mountain chains traverse the country, of which the Samen Mountains in the northern section are the most important. These mountains have an altitude of about 10,000 feet, while Ras Dashan, elevation 15,000 feet, may be regarded the culminating peak. The Talba Wakha Mountains are located south of the predominating group and are less elevated, their highest peaks being about 9,000 feet above the sea. The southern portion is less mountainous, but rocky hillocks characterize the surface. Numerous extinct volcanoes are found in both groups of mountains, and partly obliterated craters and hot springs are abundant.

Lake Tzana is the largest body of water and the source of the Atbara, or Black Nile. It is located at an altitude of nearly 6,000 feet, and occupies an area of 1,150 square miles. There is a general depression toward this lake. The chief rivers, besides the Atbara, are the Abai or Blue Nile, the Hawash, and the Takazze, a tributary of the Atbara.

Though wholly within the tropics, Abyssinia, owing to its elevation, has a temperate climate, and yields the usual products of the temperate zone. It is usually divided into three climatic areas, the regions below 4,800 feet, the sections between 4,800 to 9,000 feet, and the portions having an altitude above 9,000 feet. There are two seasons, the rainy and the dry, and the precipitation is greatest from December to May. From October to April, at Gondar, 7,420 feet above the level of the sea, the average temperature is 68°, while the temperature in more elevated sections ranges from 45° to 50° Fahr. The soil is well adapted to the cultivation of the harder cereals, and the climate is generally healthful.

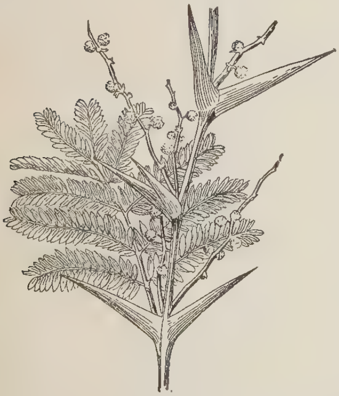
INDUSTRIES AND RESOURCES. Agriculture is the chief industry, though the methods of farming are primitive. Occupation is an evidence of title to land, which is divided principally among families. Wheat, barley, and cattle are the chief products. Oranges, bananas, and lemons thrive, but are not carefully cultivated. There are few manufactured products aside from wearing apparels and primitive implements. The minerals consist chiefly of coal, iron ores, silver, gold, and salt, but mining has not been developed to any great extent. Wild animals infest the forests and mountains, including the zebra, hyena, lion, wolf, leopard, buffalo and elephant, and in the regions of streams and lakes abound the rhinoceros and the hippopotamus. The chief exports include coffee, wax, gum, gold, tobacco, and ivory, while the imports embrace textiles, clothing, glassware, and military stores.

EDUCATION AND RELIGION. Until recently the country had no system of public education, the masses having had little opportunity to attend schools, and instruction was confined to the richer classes in the cities. However, all male children over twelve years of age are now required to attend school. Most of the educational work is in the hands of the clergy and Coptic teachers brought from Egypt. Christianity was introduced into the country in the fourth century, but in teaching and practice has been greatly perverted. The Gallas are Mohammedans and the Falashas profess Judaism. Polygamy is practiced extensively among the non-Christian classes.

GOVERNMENT. The government is an absolute monarchy, feudal in character, and the reigning sovereigns for centuries trace their lineage back to the Queen of Sheba, who visited Solomon, King of Israel, for the purpose of beholding his enterprise and power. Menelik II. is the present king or *negus*, and his official title is "King of the Kings of Ethiopia and Conquering Lion of Judah." He holds his office from personal qualities rather than by legal or traditional rights. The Maria Theresa dollar is the chief medium of exchange, but considerable of the business is carried on by barter, especially in cartridges and salt bars of uniform size. The chief cities are Addis Abeda, Gondar, Adua, Harrar, and Aukober. Harrar is the leading commercial center.

HISTORY. The country is a part of ancient Ethiopia, and the people are still called Ethiopians, but are a mixture of Hamites, Semites, and Negroes. The name Abyssinia came from the Portuguese and signifies that the people are a mixture of many tribes. Some think that the Cush of the Scriptures corresponds to Abyssinia. The country was invaded by the Greeks under Ptolemy Euergetes in 247 B. C., and some traces of Greek influence still remain. When Christianity was introduced in the fourth century, the Abyssinian Church had its seat at Axum, but the head of the church is now at Abuna. With the spread of Mohammedism near the close of the sixth century, Abyssinia was isolated from other countries and relapsed into a primitive half-barbarous civilization. It regained power in the fourteenth century, and in the sixteenth century strenuous efforts were made by Portuguese Jesuits to replace the national religion with Catholicism. In 1633 the Jesuits were expelled and the country relapsed and remained isolated until the 19th century.

Sir Robert Napier invaded the country with a British army in 1868 as a result of Abyssinian depredations in sections over which the English had established a protectorate, and King Theodore committed suicide, after having met with a thorough defeat. He was succeeded by King John, who fell in battle with the Dervishes of the Sudan in 1889. His successor, Menelek II., (died in 1914) was a good ruler. Italy claimed a protectorate over Abyssinia under the Treaty of Uchali in 1889, but this was set aside in the Treaty at Addis Abeba in 1896. By the latter treaty the independence of Abyssinia was recognized. The king modernized the government in 1907 by establishing a cabinet of ministers, including those of finance, foreign affairs, war, justice, and commerce. Empress Zeoditu became the ruler of the country in 1916. Abyssinia remained neutral throughout the World War. The trade in slaves was forbidden in 1923. In the same year it became a member of the League of Nations. Diplomatic relations between the United States and Abyssinia were reestablished in 1928.



ACACIA.

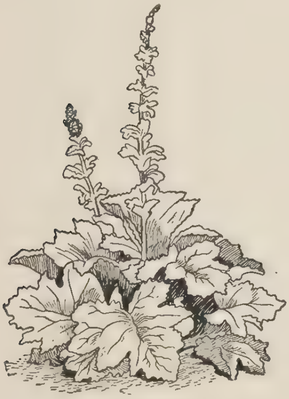
ACACIA (ȧ-kā'shȧ), a deciduous plant widely distributed in various portions of the earth, but not found native in Europe. It is most abundant in India, tropical America, Africa, and Australia. About 300 varieties are native to Australia, including the wattletree, which is from fifteen to thirty feet in height, while in North America a form of the same plant is known under the name of locust or honey locust. The plant grows in height from a shrub to a tree ranging from twenty to thirty feet, and is cultivated for its foliage, flowers, and wood. Some species yield a bark containing a large per cent. of tannin, while others yield perfume and gum arabic.

ACADEMY (ȧ-kăd'ē-mȳ), the name first applied to the school founded by Plato, and which originated from the place where that philosopher met and conversed with his pupils. The place was in a park or garden in the suburbs of Athens said to have belonged to Academus, and was presented by him to the city for a gymnasium. In modern times the name came to be applied to schools that communicate more than the mere elements of instruction, or schools instructing pupils that have already acquired the rudiments of an education, as colleges and some classes of universities. The name academy is also used to designate societies of artists linked together for the promotion of interest in art, and to various associations of scholars, scientists, and literary men who promote artistic and intellectual interests. Thus, Cardinal Richelieu in 1835 established the celebrated French Academy to fix and polish the French language. It included among its membership the best scholars of that country, but was dissolved by the Revolution in 1793. The greatest work of this organization was the publication of a complete French dictionary.

The Royal Academy, Burlington House, London, is an association of English artists, and is similar in organization to the French Salon. The Royal Academy of Berlin, founded in 1700 by Frederick II. of Prussia, has two sections—physics-mathematics and philosophy-history. Many such societies are maintained in the United States, the oldest of which is the American Philosophical Society, organized by Benjamin Franklin in 1743.

ACADIA (a-kā'dĭ-a), the name given by the French to Nova Scotia, New Brunswick, and part of Maine, the most important portion being Nova Scotia. French colonists made settlements in Acadia in 1604 under De Monts. Argall conquered it for England in 1613, and it remained in English hands till 1657, but did not become their permanent possession until so declared by the Peace of Utrecht in 1713. In 1756 about 6,000 of the French inhabitants were forcibly removed from their homes by the British on account of opposition manifested by them to oppressive legislation, an incident on which Longfellow's "Evangeline" is based.

ACANTHUS (ȧ-kăn'thŭs), a genus of plants, chiefly tropical, found in the south of Europe, Asia Minor, and India, the most common species of which is the *acanthus mollis,* a native of moist shady places in the south of Europe. It has pretty foliage and large white flowers tinged with pale yellow. Several species are cultivated as greenhouse plants for their shining leaves and white flowers. The idea of the beautiful Corinthian capitals of the Greek columns is said to have been derived from a basket filled with the roots of this plant, set down carelessly by a girl, and covered with a tile; when the leaves, forcing their way through the crevices, and rising toward the light, until met by the underside of the cover, presented the effect of the foliage and volutes, simulated by the Grecian chisel.


ACANTHUS.

ACAPULCO (ä-kȧ-po͞ol′kȯ), a seaport of Mexico, in the State of Guerrero, about 230 miles southwest of the City of Mexico. Its harbor is one of the best on the Pacific Coast. It has considerable domestic and foreign trade, the latter with San Francisco, China, and the Philippines. The chief exports are indigo, fruit, wood, lumber, and cochineal. Acapulco reached its greatest importance at the time of the French occupation. Its trade suffered greatly by the construction of the railroad between San Blas and the City of Mexico. Population, 5,000.

ACCELERATION (ăk-sĕl-ẽr-ā′shŭn), a term employed in measuring the rate of increase or decrease of the velocity of a body whose motion is not uniform. A common instance of increasing acceleration is found in a body falling from a height, and of negative acceleration in a ball thrown from a cannon. The term is also employed to denote the velocity of heavenly bodies in their orbits, especially when passing from perigee to apogee and vice versa. The numerical value of acceleration is about 32.2 feet per second; hence a body falling freely through the air has a velocity of 32 feet at the end of the first second, at the end of the next second the velocity is 64 feet, at the end of the third second it is 96 feet, and so on until it reaches the earth.

ACCENT (ăk′sĕnt), in reading or speaking, the stress of voice placed upon the syllable of a word. English accent was placed originally upon the root, and not upon inflectionable syllables. A change in the position of accent distinguishes a noun from a verb, as ac′cent, accent′; con′test, contest′. In like manner a change of accent distinguishes an adjective from a verb. Accent has exercised a marked influence in changing the form of many words in the English language.

Accent, in music, is a distinction of certain portions or places of measure, or a stress placed on certain tones. Long measures, as in words of several syllables, may have a primary accent and several secondary accents. A number of signs and marks have been invented to express the various shades of accentuation, as for instance, f (*forte*), ff (*fortissimo*), p (*piano*), pp (*pianissimo*), mf (*mezzo forte*), sf (*sforzando*), cres (*crescendo*), decres (*decrescendo*), and many others.

ACCLIMATION (ăk-klĭ-mā′shŭn), or **Acclimatization,** the process or art by which plants or animals are accustomed to a climate or locality not natural to them. The process depends upon the difference between the new locality and the one formerly occupied, as well as upon the nature of the plants or animals acclimatized. In recent times acclimatization has been made a subject for systematic study, and some valuable discoveries have resulted. The ability of the different races of man to bear changes of climate usually is in direct ratio to the intellectuality of the race. Civilized people display greater mental and physical endurance than savages in accommodating themselves to changes of climate, this resulting, of course, from their superior care and power to accommodate themselves to different modes of life. Modern civilization and commercial enterprise have been greatly benefited by the acclimatization of cereals, herbs, and animals. For insance, the reindeer and dog have been acclimated to the polar regions, silkworms have been brought from China to the Baltic regions of Europe, and, in like manner, animals and plants of various kinds have been made to serve man's purpose in greatly diversified parts of the earth. However, this is spoken of more properly as naturalization than acclimatization.

ACCORDION (ăk-kôr′dĭ-ŭn), a musical instrument in the form of a small box, arranged to be drawn by the hands in such a manner as to supply wind to act on metallic reeds fixed at one or both extremities, thus operating to set the reeds in vibration. An accordion has two sets of metallic reeds, so constructed that the same tones are produced as a result of pulling or pressing the bellows. The harmonium and concertina are similar instruments, and are in more or less general use among Europeans.

ACCOUNT (ak-kount′), a list of items of debits or credits between two or more parties, or a statement of the particulars of such an account. When each of two parties has demands against the other, as in the case between two merchants, each of whom has sold goods to the other, the account is said to be *mutual.* The account is considered *open* or *current* until a statement is *rendered.* A *stated* account is one that has been accepted as correct by the one against whom it shows a balance. The recipient of a statement, if the account is found incorrect, should give verbal or written notice of that fact within a reasonable time, else its acceptance will be implied. However, corrections on account of fraud or mistakes can be made subsequently.

ACCUM (äk'ko͞om), **Friedrich,** chemist, born in Westphalia, Germany, in 1769; died in 1838. After attending several universities in his native country, he went to London, where he was made professor of chemistry and mineralogy in the Surry Institute. In 1822 he was appointed professor in the School of Industry in Berlin. He is celebrated on account of his exertions in the introduction of gas lights. His principal work, "A Practical Treatise on Gas Lights," was published in 1819, and exerted a great influence in introducing the use of gas lights into the principal cities of England. He wrote a work on "The Adulteration of Food," which excited much attention.

ACCUMULATOR (ăk-kū'mū̇-lā̇-ter), an apparatus by means of which electricity may be accumulated so as to produce directly an electric current. This apparatus is generally known as a storage battery, and its use depends upon the principle that a current acting upon grooved lead plates and lead electrodes causes certain chemical changes. In some cells two lead plates are immersed in dilute sulphuric acid in water, the mixture having a specific gravity of 1.17. When the circuit of a battery is closed, the chemicals recombine and give off a current almost equivalent to that which decomposes them. The two general classes into which accumulators are divided are those known as the Faure type and the Planté type. In the former some easily reducible salt of lead is applied mechanically, and in the latter peroxide of lead is formed by electrochemical action on the surface of the coiled plates used in constructing the cells. In order to charge the battery it is connected with a dynamo and the electricity is retained until required for use, though there is a very rapid depreciation if the batteries are not operated with care. Storage batteries are commonly employed in automobiles and in many central stations to aid the dynamos when the maximum output is required.

ACETANILID (ăs-ĕt-ăn'ĭ-lĭd), a crystalline powder obtained by the action of acetic acid on aniline. It has a slightly bitter taste, is odorless, and is frequently taken as a medicine for allaying pain. It is used for headache, generally given in tablet or capsule, and its effect is injurious if not administered with great care.

ACETATE (ăs'e-tā̇t). See **Acetic Acid.**

ACETIC ACID (ȧ-sē'tĭc ăs'ĭd), an acid composed of oxygen, hydrogen, and carbon, and forming the sour principle of vinegar. In a pure state it is poisonous, has a sour taste and pungent smell, refracts light powerfully, and does not mix with water except at high temperature. It is the product of the acetic fermentation of many vegetable and animal juices, and in some plants is found naturally formed. It is solid at temperatures below 62° Fahr. The action of the micro-organisms of the air on wine or weak spirits produces vinegar, which is a dilute acetic acid. Many dilute and concentrated forms of acetic acid are employed in medicines and the arts. It aids digestion by its solvent action upon albuminous and protein compounds, hence the use of vinegar with foods that are not easily digested. When acetic acid is united with a base or radical, it forms a salt known as an acetate. The acetates of ammonium, iron, lead, potassium, sodium, and zinc are employed in medicine. Those of iron and aluminum are used in calico printing, while that of copper, known as verdigris, is useful as a color.

ACETYLENE (ȧ-sĕt'ĭ-lēn), a pure hydrocarbon gas produced by passing an electric current between carbon poles in an atmosphere of hydrogen, also by hydro-carbon in a state of incomplete combustion. Small quantities of it are present in ordinary illuminating gas. It is colorless and clear, and burns with a bright flame. The flame is brilliant and steady, produces no smoke and little heat, and its intense brilliancy gives it preference for illumination. Until recently it was produced only in laboratories, being too expensive for use, except in experiments. It is now obtained at a very nominal cost by fusing coal dust and lime in an electric furnace, and then bringing the resultant calcic carbide in contact with water. The proportion of lime is 1,130 pounds to 1,750 pounds of coal dust, and the resultant is 2,000 pounds of calcic carbide. When the carbon of the calcic carbide is united with the hydrogen of water, the acetylene gas is formed and is utilized as it rises to the top.

The credit of discovering the method of producing acetylene gas on a commercial basis is due to T. L. Willson, who, as one of the promoters of the Willson Aluminum Company at Spray, North Carolina, was aided by J. T. Morehead, a student and geologist. In conducting a line of experiments, they placed lime and coke in an electric furnace, which, after being fused together, was thrown into water with the result that gas was formed and when lighted it burned with a clear flame. This discovery caused calcium carbide to become an article of commerce. It is placed in portable generators and sold directly to consumers, who make their own illuminating gas by the use of small generators. At Niagara Falls and a number of other places are large electric furnaces for the purpose of making the commercial product. About 2,000 pounds of carbide are produced by 180 electric horse power in twelve hours, which quantity has an illuminating value equal to 100,000 cubic feet of ordinary gas. Its inexpensive manufacture revolutionized certain forms of welding and illumination. Pure acetylene requires a special burner, by which it is sufficiently mixed with air before it begins to burn.

A new system of producing power was obtained by a mixture of acetylene gas and alcohol vapor in internal combustion engines. When a certain proportion of acetylene is added to alcohol vapor, a quicker burning, more explosive mixture results. This makes it possible to obtain from a given size of gasoline engine the same horse power when operated with alcohol as when gasoline is used, without the greatly increased consumption that ordinarily occurs when this is attempted. Acetylene gas is thus used as an enricher of commercial alcohol, and is likewise employed to increase the illuminating power of coal gas and other combustible gases.

ACHAEA (ȧ-kē′ȧ), one of the ancient divisions of the Peloponnesus, extending along the coast of the Gulf of Corinth. Its greatest length from east to west is about 65 English miles. It varies in breadth from 12 to 20 miles. Patras, formerly Patrae, is the only Achaean town that maintains any importance. After the Roman conquest of Greece and Macedonia, the province of Achaea included all of the Peloponnesus, with Northern Greece south of Thessaly. In the present kingdom of Greece it constitutes a division for the purposes of administration.

The Achaeans comprised one of the four main divisions of the ancient Greeks. Their mythological ancestor was Achaeus, son of Xuthus, and grandson of Hellen. They migrated from Thessaly to the Peloponnesus, where they held the preponderance of power, and for a long time maintained a confederacy of twelve towns, known as the Achaean League. It was broken up after the death of Alexander the Great, reorganized in 280 B. C., and finally suppressed by the Romans in 146 B. C. The "Iliad" designates the whole Hellenic host before Troy as Achaens.

ACHARD (ȧ-shär′), **Frans Karl,** chemist and naturalist, born in Berlin, Germany, April 28, 1753; died April 20, 1821. He studied in his native city, and distinguished himself by his discovery of an improved process for making sugar of beet roots. His discovery attracted the attention of the King of Prussia, who gave him a farm in Lower Lusatia, where he founded a successful factory of beet sugar. The factory became highly profitable in 1812, and the king established in connection with it a school for teaching the art of manufacturing sugar. Later Achard became director in the Berlin Academy of Sciences. To his discovery and successful application of newer methods is due the extensive beet sugar manufacture of modern times.

ACHATES (ȧ-kā′têz), companion of Aeneas in his flight from Troy, and in his subsequent wanderings, according to the account given by Virgil in his "Aeneid." He is always termed *fidus* (faithful), whence the phrase has passed into a proverb applied to any faithful confident and companion.

ACHEEN, or **Achin** (ăt-chēn′), a city and state of northern Sumatra, the only state of that island long independent of Holland, but ceded to that power in 1879. It was a powerful state in the seventeenth century, and long resisted attempts at colonization made by the Portuguese, but gradually lost its power with the rise of Dutch supremacy in Sumatra. There are extensive productions of rice, pepper, gutta percha, bamboos, iron, sulphur, and camphor. The forests yield large quantities of merchantable lumber, and there are also productions and exports of fruits and live stock. The state has an area of 20,500 square miles.

ACHELOUS (ăk-ê-lō′ŭs), a river of Acarnania, which, rising in Mount Pindus, and dividing Aetolia from Acarnania, flows into the Ionian Sea. Homer calls it "king of rivers." It is the largest stream in Greece, its length being 130 miles. It is now called Aspro Potamo.

ACHERON (ăk′ê-rŏn), in Greek mythology, a river of the lower world, and which is connected with many ancient legends. Around it were supposed to hover the shades of the departed, while Charon was reputed the ferryman who piloted those permitted to enter the realm of the dead across its water.

ACHILL (ăk′ĭl), or **Eagle Island,** the largest island off the west coast of Ireland, and included with the county of Mayo. Its shape is almost that of a right-angled triangle, while its length is about fifteen miles, and breadth twelve miles. The surface is mostly marshy and boggy, and the inhabitants engage chiefly in fishing. The area is 51,521 acres, and the population, 4,975.

ACHILLES (ȧ-kĭl′lēz), in Greek mythology, the son of King Peleus and the sea goddess Thetis, thus belonging to a line of descendants from Jove. He was made the hero of Homer's "Iliad," and is counted the bravest of the Greeks in the Trojan War. At infancy his mother dipped him by the heel in the river Styx to make him invulnerable to the weapons of his enemies, but in so doing failed to submerge the heel, which remained the only vulnerable part of his body. It the Greek campaign against Troy, Achilles was equipped with fifty vessels manned by his followers, but remained inactive and sullen during a great part of the contest. His inactivity continued until Patroclus was slain by Hector, when the hero buckled on the armor made for him by Vulcan to battle with the enemy. He slew a great many Trojan heroes, among them Hector, a skilled warrior of the Trojans, whose body was fastened to his chariot and dragged into the camps of the Greeks. He then buried Patroclus with great military honors, and at the request of King Priam, who came by night to the tent of Achilles, allowed the body of Hector to be taken back to the Trojans. The "Iliad" closes with an account of the burial of Hector. Achilles was killed by an arrow from the bow of Paris, which pierced his heel, the only portion not submerged in the river Styx.

ACHILLES, Tendon of, the tendon which connects the heel bone with the muscles of the calf of the leg. It is so named from Achilles, a Greek leader in the Trojan War. This tendon is capable of resisting a force equal to 1,000 pounds weight, but is occasionally ruptured.

ACHMIM, or **Akhmim,** a town in Middle Egypt, on the right bank of the Nile. It is the Chemmis of Herodotus, and near it are ruins of two temples. The hills in its vicinity have many excavations, made originally to receive mummies, but which afterward served as a refuge for Christians during the persecutions of Diocletian.

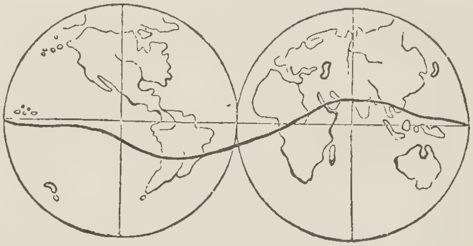
ACHROMATISM (ȧ-krō′mȧ-tĭzm). See **Prism.**

ACID (ăs′ĭd), in chemistry, a compound of hydrogen in which all or part of the hydrogen can be replaced for a metal or a basic radical, thus forming a new compound. A majority of acids, when placed to the tongue, produce a taste called sour. They change the blue colors of vegetables to a red, while some colors, previously converted to green by alkalies, may be restored by acids. However, these properties are variable. The acids generally contain oxygen united with another element that gives the name to the particular acid, as sulphuric acid, which contains sulphur, oxygen, and hydrogen. Many organic gases occur in the juices of vegetables and some in animals, such as the acid of ants, commonly known as formic. Hydrochloric, nitric, sulphuric, and many other acids are important in the industries. Vinegar contains acetic acid; lemons, citric acid; grapes, tartaric acid; and currants, gooseberries, and apples, malic acid. Prussic or hydrocyanic acid is found in leaves, almonds, and several varieties of fruits. Prussic acid is used for flavoring in small quantities, but is usually classed as a poison.

ACIREALE (ä-chĕ-rȧ-ä′lȧ), a seaport of Sicily, at the mouth of the Aci River, nine miles northeast of Catania. It has a considerable trade in wine and fruit, and manufactures silk and cotton goods. Near it are celebrated mineral springs and the famous grotto of Galatea and the cave of Polyphemus. Population, 27,875.

ACKERMANN Rudolph, publisher, born in Schneeberg, Germany, April 20, 1764; died March 30, 1834. He commenced life as a saddler, and after residing for some time in Paris and Brussels removed to London. On his first arrival in that city, he sold colored patterns for coachmakers. His success in this trade having inspired him with an idea of doing better, he took a place in the Strand, which afterward became the famous repository of arts, and his taste and enterprise soon made his warehouse a place of great attraction. He early established a lithographic workshop in London, an art to which he had devoted much personal attention. He issued numerous engraved annuals, including "The Forget-me-not," "Microcosm of London," "Histories of Westminster Abbey," and "Oxford and Cambridge."

ACLINIC (ȧ-klĭn′ic) **LINE,** a line imagined drawn around the earth near the terrestrial equator, on which the magnetic needle has no inclinations. When the compass is placed on this line, the needle balances itself horizontally. It is known as the magnetic equator, being about 90° from the magnet poles, though this line is variable and irregular.



ACLINIC LINE.

ACONCAGUA (ä-kŏn-kä′gwȧ), a mountain of Chile, situated near 31° south lat. and 70° west long. Its height is 23,910 feet. It is counted the highest peak in America, being 1,422 feet higher than Mount Sorata, Bolivia. On its southern slope rises the Aconcagua River, which, after a course of 200 miles, flows into the Pacific.

ACONITE (ăk′ŏ-nīt), a genus of plants so named from Acone, in Bithynia, which is famous for its poisonous herbs. It belongs to the natural order *ranunculaceae;* many of its species have long been known for their poisonous properties. Several are cultivated in our gardens, and are known by the familiar names of wolfsbane or monkshood. The latter term designates the distinguishing mark of the genus, which is the uppermost segment of the calyx overhanging the petals and other parts in the form of a helmet. The roots and leaves of the *aconitum napellus* are used for the preparation of some powerful medicines, which act as drastic purgatives, which are also externally applied as an anodyne remedy in acute pains affecting the nerves, and in rheumatic and syphilitic complaints.

ACOUSTICS (ȧ-kous′tĭks), the science that treats of sound and of the laws of its production and propagation. Sound is produced by the vibration of particles in a sonorous body, and is induced by a blow or in some similar way. It requires an elastic body for its transmission to the tympanum of the ear, and is heard when brought in contact with air, but becomes inaudible in a vacuum. Its rate of progress through dry air, at a temperature of 32°, is about 1090 feet per second, but its motion through metallic rods is much more rapid.

Refraction of sound is a change of direction and velocity, which is caused by passing from one medium to another of a different kind. Reflection of sound is a change of direction caused by meeting a medium different from the one passed through, and, in addition to transmitting to it a refracted wave, induces it to pass in a different direction with an equal velocity. In this way sound may be repeated, as from an echo-producing cliff or hill. Pythagoras and Aristotle were aware that sound is propagated through air, and attempted to develop the science of acoustics, but its foundation was not laid until the time of Bacon and Galileo. Newton demonstrated by calculations how the propagation of sound is due to the elasticity of the conducting medium. The science of sound owes its progress particularly to the researches of Newton, Laplace, and the German physicist Hermann Helmholtz (1821-1894).

The subject of acoustics merits earnest consideration, since many public buildings are illy planned, and many principles of acoustics disregarded. As a general rule, ceilings should be of a medium elevation, many ceilings being too high to facilitate both hearing and speaking. Stretching wires across halls and hanging draperies have a moderating effect. The whispering gallery of St. Paul's, London, is a fine example of successfully taking advantage of the basic laws of acoustics in public buildings.

ACRE (ā'kẽr), a quantity of surface equal to 4,840 square yards. It came into use as a standard of measurement on account of the amount of land one man could plow in a day. The size of the acre differs in different countries, because the capacity of plows formerly used differed widely. The chain with which land is measured is twenty-two yards long, and a square chain consists of 22x22, or 484 yards, hence an acre contains ten square chains. The acre is divided into four roods; a rood into forty perches, and a perch into thirty square yards. Below is a table showing the relative measurements of the most important nations as compared with the acre used in the United States and Great Britain.

English, Acre	1.00
Scotch "	1.27
Irish "	1.62
Austria, Joch	1.42
Belgium, Hectare	2.47
Denmark, Toende	5.50
France, Hectare	2.47
France, Arpent (common)	0.99
Germany, Hectare,	2.47
Holland, Morgen	2.10
Naples, Moggia	0.83
Poland, Morgen	1.38
Portugal, Geira	1.43
Russia, Deciatina	2.70
Sardinia, Giornate	0.93
Spain, Fanegada	1.06
Sweden, Tunneland	1.13
Switzerland, Faux	1.63
Switzerland, Geneva, Arpent	1.27
Tuscany, Saccata	1.22
United States, Acre	1.00
Roman, Jugerum (ancient)	0.66
Greek, Plethron (ancient)	0.23

ACRE (ā'kẽr), or **Akka**, an important seaport of Syria, on the Mediterranean Sea, and anciently called Ptolemais. It has experienced many notable changes through the calamities of war and revolution. In 1799 it was defended by the Turks against Napoleon, who laid seige upon it for sixty-one days, and by Mehemet Ali, Pasha of Egypt, in 1831-32, against a seige of six months by his son, Ibrahim Pasha. Acre remained in the hands of the Egyptians till Nov. 3, 1840, when it was taken by the British. It again came into possession of the Turks in 1841, to whom it now belongs. The city has a moderately good harbor, and is connected with Kersha and other interior cities by railways. Population, 10,500.

ACROPOLIS (ȧ-krŏp'ō-lĭs), the name applied by the Greeks to a prominent place in a city, usually to an eminence from which the city can be viewed. In ancient times the Acropolis of Athens contained the Parthenon and other fine buildings.

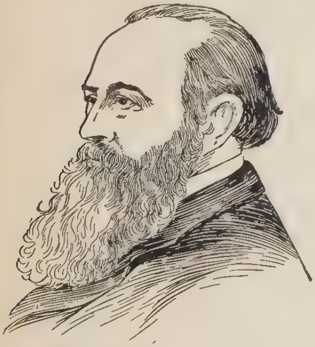
ACROSTIC (ȧ-krŏs'tĭk), a stanza or stanzas of poetry, the lines of which are so arranged that the initial letters taken in order constitute a name or a sentence. In Hebrew writings this plan was used largely in poetry, and frequently the initial letters were made to cover the entire alphabet. In the original, the 119th Psalm and eleven others are written in this manner. Acrostics are frequently used in writing complimentary verses, when the initial letters usually form the name of the person complimented. The following will serve as a sample:

Electric essence permeates the air,
Lighting the heavens with its brilliant glare,
Encircling planets in its huge embrace,
Controlling all the elements of space;
'Tis this that sways the immortal mind,
Refines and elevates all human kind;
In it the spirit finds its highest light,
Celestial source of God, the Infinite.

ACTAEON (ăk-tē'ŏn), a famous Greek hunter, grandson of Cadmus. He was trained by Chiron and excelled in hunting. For the crime of watching Diana while bathing, he was transformed into a stag and devoured by his own dogs.

ACTINISM (ăk'tĭn-ĭz'm), the peculiar property or force of that portion of the sun's rays which produce the chemical effects shown in photography, and the effect of causing the seeds of plants to germinate. That the actinic rays are different from those which produce heat and light was shown by J. W. Draper of New York, in 1842. The quantity of actinism in the sun's rays varies with the time of the day, and with the seasons. Its deficiency in the tropics renders it difficult to obtain good pictures there, except with the more powerful instruments. Its greater abundance in the spring of the year causes this to be the best period for taking pictures, as it is the season for the germination of seeds and the opening of buds. This principle is obstructed by the passage of rays of light through yellow glass. Hence the unsuitableness of this glass for greenhouses, while the use of blue or violet glass is recommended as a means to aid in the rapid growth of plants. Modern medical science has demonstrated the wisdom of employing blue and purple rays in treating certain diseases. That the different rays of sunlight possess a varying degree of power in producing chemical changes may be shown by spectrum analysis. See **Spectrum.**

ACTIUM (ăk'shi-ŭm), now called Akri, a town and promontory on the west coast of Greece, on the Gulf of Arta, and noted for the naval battle between Octavianus, who later became Emperor Augustus of Rome, and Mark Antony and Cleopatra, on Sept. 2, 31 B. C. Octavianus commanded 80,000 infantry, 12,000 cavalry, and 260 ships; while Antony had 100,000 infantry, 12,000 cavalry, and 220 ships, and was supported by Cleopatra with sixty vessels. Antony was defeated and fled with Cleopatra to Egypt. To commemorate the victory Octavianus enlarged the temple of Apollo, and instituted games to be celebrated every four years.


JOHN EMERICK EDWARD DALBERG ACTON.

ACTON (ăk'tŏn), **John Emerick Edward Dalberg**, historian and statesman, born at Naples, Italy, Jan. 10, 1834; died in 1902. He was liberally educated, and in 1859 was elected to Parliament from Carlow, Ireland, where he became a leader of the Catholic party. In 1869 he was raised to the peerage, and in the same year was conspicuous as an opponent to the doctrine of papal infallibility, which he denounced at the Ecumenial Council in Rome. He was appointed regius professor of modern history at Cambridge in 1895. His chief interest in life was Liberalism, both in politics and religion, and a series of letters written by him to the daughter of Gladstone reveal a remarkable accumulation of knowledge on economics, politics, and literature. He founded the *Home and Foreign Review* and published "Lecture on the Study of History."

ACTS OF THE APOSTLES, the fifth book of the New Testament, written in Greek about 63 or 64 A. D., and generally thought to be the work of Saint Luke, a physician and painter of Antioch, who had been converted by the teaching of Saint Paul. The Acts embrace the history of the church in Judea and Asia Minor during the period of about thirty years after the death of Christ, from the time of the Resurrection until the second year of Saint Paul's imprisonment in Rome. While Philip and Saint Peter are mentioned in the Acts, the principal personage is Saint Paul.

ACUPUNCTURE (ăk-ū-pŭnk'tûr), a surgical operation employed among the Chinese and Japanese, in headaches, lethargies, convulsions, colics, etc. It is accomplished by piercing the part which is the seat of the malady with a silver needle. Modified forms have been adopted by American and European physicians for the treatment of neuralgia, rheumatism, and other diseases.

ADAM AND EVE, the first parents and progenitors of the human race, whose creation is described in Genesis. They were the parents of three sons—Cain, Abel, and Seth. Since Abel was slain by Cain and the latter lost in history, Seth is regarded the direct ancestor of the Hebrew people.

ADAMS, a town of Berkshire County, in the northwest part of Massachusetts, forty-seven miles northwest of Springfield. It is situated on the Hoosac River, near Mount Greylock, altitude 3,600 feet, the highest point in the state, and on the Boston and Albany Railroad. It was platted in 1749, as East Hoosuck, and was incorporated in 1778, when it was renamed in honor of Samuel Adams. Population, 1900, 11,134; 1905, 12,486; in 1925, 13,525.

ADAMS, Charles Francis, statesman and author, son of John Quincy Adams, born in Boston, Mass., Aug. 18, 1807; died Nov. 21, 1886. He was Whig, but went over to the Free Soil party in 1848, and was its unsuccessful candidate for Vice-President in that year. In 1858 he was elected to Congress as a Republican, was reelected in 1860, and after 1861 served for three years as minister to England. He was an arbitrator of the Alabama Claims in 1871-72, and for several years served as overseer of Harvard College. Adams was skilled as a diplomat, a speaker of ability, and an efficient scholar. He edited the memoir of his parents and grandparents.

ADAMS, Charles Francis, lawyer and public man, born at Quincy, Mass., Aug. 2, 1866. The son of John Quincy and Fanny Crowninshield Adams, he is a direct descendant of President John Adams. His education was obtained in public schools and at Harvard University. In 1893 he was admitted to the bar and began the practice of law. For some years he was a law partner of Judge Everett C. Bumpus. President Hoover appointed him Secretary of the Navy in 1929, in which capacity he succeeded Curtis D. Wilbur.

ADAMS, Charles Francis, author and statesman, born in Boston, Mass., May 27, 1835. His father, Charles Francis Adams, provided for his education at Harvard University. He graduated in 1856, and after studying law was admitted to the bar in 1858. He enlisted in the Union army at the beginning of the Civil War, became a captain in 1862, and at the close of the war was brevetted brigadier general in the regular army.

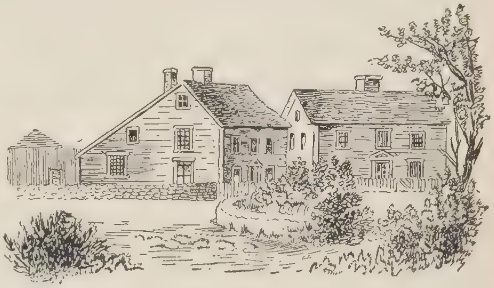
He was president of the Union Pacific Railway Company in 1884-90, and served two years as chairman of the Massachusetts Park Commission, in which position he did much to improve the park system of the state. Subsequently he devoted much time to the study of history, and in 1901 was chosen president of the American Historical Association. His chief writings embrace "Chapters on Erie and Other Essays," "Massachusetts, Its Historians and Its History," and "Life of Charles Francis Adams." He died in Washington, D. C., March 20, 1915

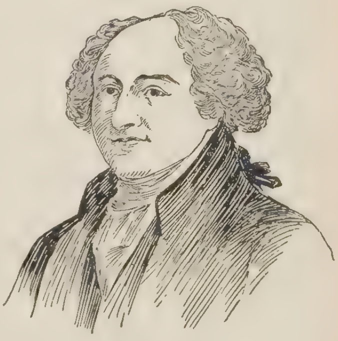
ADAMS, Charles Kendall, educator and historian, born at Derby, Vermont, Jan. 24, 1835; died July 26, 1902. At the age of twenty years he removed to Iowa. He attended the University of Michigan at Ann Arbor, Michigan, from which institution he graduated in 1861. From 1863 to 1867 he was assistant professor of Latin at Ann Arbor, and was teacher of history from the latter year until 1885. In the meantime he studied in Germany and France and succeeded Andrew D. White as president of Cornell University in 1885, which position he resigned in 1892 to become president of the University of Wisconsin, and served in that capacity until 1902. His publications include "Manual of Historical Literature," "Democracy and Monarchy in France," and "Christopher Columbus, His Life and York." He was editor-in-chief of Johnson's "Universal Cyclopaedia."

ADAMS, Henry, political essayist, son of Charles Francis Adams, born in Boston, Mass., Feb. 16, 1838. He graduated at Harvard College in 1861, and soon after accompanied his father to England. On returning to the United States a few years later, he was elected instructor at Harvard, and in 1870-76 was editor of the *North American Review.* His chief writings include "Life of Edward Gallatin," and "History of the United States." He died Aug. 11, 1921.

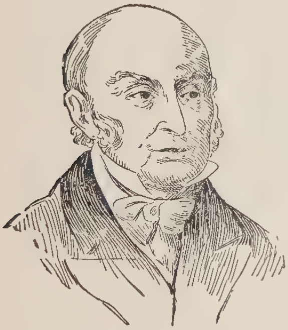
ADAMS, Herbert Baxter, historian and educator, born at Amherst, Mass., April 16, 1850; died July 30, 1901. He studied at Amherst and Heidelberg, and in 1876 was appointed fellow of history at Johns Hopkins University. He was connected as professor with this institution until 1891, when he resigned owing to ill health. From 1884 until 1900 he was secretary of the American Historical Association and in the latter became its first vice-president. He took much interest in university extension work and exercised a wide influence upon the study of history and the lives of numerous students. His publications include "Life and Writings of Jared Sparks," "Thomas Jefferson," "The University of Virginia," "Study of American Colleges and Universities," "The Germanic Origin of New England Towns," and "Johns Hopkins Studies in History and Political Science."

ADAMS, John, second President of the United States, born in Braintree, near Boston, Mass., Oct. 19, 1735; died July 4, 1826. He was the fourth in descent from Henry Adams, who fled from persecution in Devonshire, England, and settled in Massachusetts about 1630. His father, John Adams, sent him to Harvard College in 1751, from which he graduated four years later. At Worchester he studied law; taught school, and was admitted to the bar in 1758, and ten years later began the practice of law at Boston. He married Abigail Smith, daughter of the Rev. William Smith, in 1764. In 1770 he was elected to the legislature of Massachusetts, and in 1774 became a member of the Continental Congress, where he was an advocate and supporter of the Declaration of Independence. He went as commissioner to France in 1787, and served in that capacity about two years. In 1788 he was chosen Vice-President, with Washington as President, and when the Senate met at New York in April, 1789, he took his seat as president of that body. In 1792 he was re-elected Vice-President, and on the retirement of Washington, in 1797, succeeded him as President, in which office he served four years. He was defeated for re-election to the Presidency by Thomas Jefferson, who had a majority of one vote in the electoral college and shortly after returned to his former home at Quincy, Mass. Politically he adhered to the Federalist party, which favored a strong central government. In 1816 he headed the presidential electors of his party in the State of Massachusetts. It is a singular incident that his death occurred on the fiftieth anniversary of the Declaration of Independence, on which day Thomas Jefferson also died.


The Adams Houses, Braintree (now Quincy), Mass.
John Adams was born in the building to the right;
John Quincy Adams in the house to the left.


JOHN ADAMS

John Adams was an important factor in a number of treaties. The first was concluded in 1776, which formed a treaty with Lord Howe for the pacification of the colonies, and in 1779 he was given an opportunity by Congress as minister plenipotentiary to negotiate a peace treaty with Great Britain. In 1781 he was a commissioner to conclude peace with European powers; in 1783 negotiated with others a commercial treaty with Great Britain, and in the same year was a signer of the final treaty of peace with that country. As a constitutional lawyer and statesman he took high rank among the men who rose to prominence at the time when the new national government was organized. His ability as a reader, fluent speaker, and able writer was a powerful agency to give him rank and station among the foremost men of his time. Great mental vigor is shown in his personal writings and state papers. His works and those of John Quincy Adams were ably edited by his grandson, Charles Francis Adams, in 1850-77.



JOHN QUINCY ADAMS.

ADAMS, John Quincy, sixth President of the United States, eldest son of President John Adams, born in Braintree, Mass., July 11, 1767; died Feb. 23, 1848. He enjoyed rare educational advantages. His first instructions were given by his mother, a woman of superior talents. When eleven years old he accompanied his father to France and attended school in Paris. In 1780 he began the study of Latin and Greek at the University of Leyden, Holland. At the age of fourteen years he was appointed private secretary to Francis Dana, minister to Russia, which position he held until October, 1782, when he resumed his studies at The Hague. He completed his college work by graduating from Harvard College in 1788. In 1791 he was admitted to the bar, began the law practice in Boston, and published in the *Boston Centinel* a series of able essays in which he exposed the fallacies and vagaries of the French political reformers. These writings and others attracted the attention of Washington and caused his appointment as minister to Holland in 1794, and as minister to Berlin in 1797, from which position he was recalled in 1800. The Federalists of Massachusetts elected him a Senator of the United States for the term beginning in 1803, which office he accepted with the understanding that he would hold a chair in Harvard College at the same time. In 1807 he supported Jefferson's Embargo Act, and thereby offended the Federalists, thus becoming connected with the Democratic party. On account of Federalist opposition he resigned his seat in the Senate, and was appointed by President Madison minister to Russia. He served as commissioner with Bayard, Clay, Russell, and Gallatin on a commission that concluded a treaty of peace with British diplomatists at Ghent, Dec. 24, 1814. The following spring he was appointed minister to the court of Saint James, in which capacity he served about two years, when he became Secretary of State under Monroe. In 1824 Adams, Jackson, Crawford, and Clay were candidates for President, but, as no one received a majority of the electoral votes, the election devolved on the House of Representatives. Adams was elected by receiving the votes of thirteen states. Four years later he was defeated for re-election by Andrew Jackson. In 1830 he was elected to a seat in Congress from his Congressional district, which position he held for seventeen years, and was the only ex-President who ever served in that body. Adams was constantly at his place in Congress, and, while in his seat at the capital, was stricken with paralysis and died. He was buried at Quincy, Mass. The country was generally prosperous and times were reasonably good during his presidency.

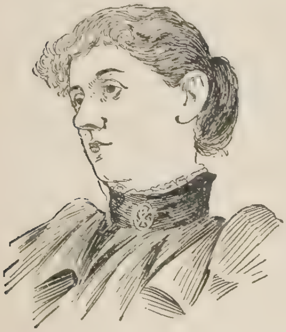
ADAMS, Maude Kiskadden, actress, born in Salt Lake City, Utah, Nov. 11, 1872. Her mother was an actress, and trained the daughter for the stage when very young, at which time she became popular in children's parts. Maude joined E. H. Sothern's company in New York City at the age of sixteen and played in "The Midnight Bell." Subsequently she joined Charles Frohman's Stock Company, and in 1892 played with John Drew in "The Masked Ball." In 1901 she won favor in New York City by playing with Sarah Bernhardt, and afterward appeared in Barrier's new comedy of "Quality Street," and in Rostand's "The Chantecler."

ADAMS, Samuel, statesman, second cousin of President John Adams, born in Boston, Mass., Sept. 27, 1722; died Oct. 3, 1803. He studied at Harvard College, graduating there in 1740, and soon after became tax collector in Boston. In 1765-74 he was a member of the Massachusetts House of Representatives, and in that capacity took an active part against the exorbitant tax schemes of England, delivering impressive addresses on several occasions. He was a member of the Continental Congress in 1771-83; supported and signed the Declaration of Independence, and voted to ratify the Constitution in 1788. On political questions he agreed with the Democratic party; was Lieutenant-Governor of Massachusetts in 1789-94, and governor in 1794-97. Few Americans showed greater devotion to the cause of American interests, and none were more influential in advocating them.

ADAMS, William, clergyman, born in Colchester, Conn., Jan. 25, 1807; died Aug. 31, 1880. He graduated from Yale in 1831, was made pastor of the Central Presbyterian Church in New York City in 1834, and later held other important ministerial positions. Besides contributing to a number of magazines, he published several sermons and treatises on Bible subjects. He ranks among the noted pulpit orators of America.

ADAMS, William Taylor, educator and author, born in Medway, Mass., July 30, 1822, died March 27, 1897. He was a teacher in the public schools of Boston for twenty years, served one year in the State Legislature, and subsequently devoted his time largely to the writing of juvenile stories. For several years he contributed serial stories to newspapers and other periodicals. He is popularly known as "Oliver Optic." His chief writings embrace "Young America Abroad," "Onward and Upward," "The Starry Flag," "The Yacht Club," "The Way of the World," and "Living Too Fast."

ADDA (äd'då), a river of Italy, a tributary of the Po. It rises in the Rhaetian Alps, flows through Valtellina and Lombardy, and enters the Po about eight miles from Cremona. Its course is about 180 miles, of which 70 miles are navigable. Lodi, the scene of one of Napoleon's triumphs, and Cassano, at which Moreau was defeated in 1799, are on its banks.



JANE ADDAMS.

ADDAMS (ăd'dȧms), **Jane,** philanthropist, born at Cedarville, Illinois, Sept. 6, 1860. After attending the public schools, she entered Rockford Female Seminary, where she graduated with honors in 1881. In 1889 she joined Ellen G. Starr in establishing the Hull House at Chicago, an eminently successful social settlement, in which she was the principal leader and worker. The Hull House is so named from Charles J. Hull, an old resident of Chicago, and is located at 335 South Halsted Street. It was formerly used as a junk shop and tenement house, and under the directorship of Miss Addams it was possible to improve it and add many new buildings, including a children's building and a gymnasium. The benevolent work of Miss Addams has lifted the lives of many young people to a higher plane and fitted them for practical service in the homes and material industries. She contributed to current periodic literature many interesting articles on topics suggestive of her association with social settlements. Her books include "Democracy and Social Ethics."

ADDAX (ăd'dăks), or **Addas,** a species of antelope related to the oryx, native to the deserts of Northeastern Africa. The form is robust, the color nearly white, tinged somewhat with reddish, and the height at the shoulders is about three feet. It has a long tufted tail and long ears, and the horns are twisted spirally, turn outward, and measure about four feet in length. The Arabs hunt it for its flesh and skin. This animal is almost extinct.

ADDER (ăd'dẽr), a general name applied to venomous snakes, but also the name of the only poisonous serpent in Britain. The latter is about two feet long, has a triangular head, and a short tail. A species known as *asp* or *puff-adder* is found in South Africa, where it is dreaded for its fatal bite. Adder's-tongue is a plant, a species of common fern, whose spores resemble a serpent's tongue. Adderwort is a name applied to snakeweed on account of its supposed virtue in curing the bite of a serpent.

ADDICKS (ăd'dĭcks), **John Edward,** public man, born in Philadelphia, Penn., Nov. 21, 1841. After acquiring a general education, he engaged as a dealer in flour and later promoted the manufacture of illuminating gas. He organized the Bay State Gas Company at Boston in 1884 and subsequently became attached to similar companies in other cities. He became known as an opponent to H. A. Du Pont in State politics of Delaware and was several times a candidate for United States Senator, but was defeated, and the State was unrepresented for some years on account of political quarrels between him and his opponents.

ADDING MACHINE. See **Calculating Machine.**

ADDIS ABEBA (äd'dēs ȧ-bā'bȧ), the capital of Abyssinia, located in the province of Shoa. It has a picturesque location at an altitude of 8,000 feet, but its streets are irregular and the buildings are poorly constructed. On an eminence is the royal palace, which consists of several buildings and is surrounded by walls. The city has a large floating population and is the mecca of many caravans. The commission that concluded peace between Italy and Abyssinia met at Addis Abeba in 1896, when Abyssinia became independent. Population, 65,000.

ADDISON (ăd'dĭ-sŭn), **Joseph,** eminent author and essayist, born in Hilston, England, May 1, 1672; died June 17, 1719. He was a son of Lancelot Addison, a minister of the Church of England, studied at the Charter House school, and afterward graduated from Oxford. Few students left that institution with a better record for scholarship, particularly in Latin versification, and he would probably have taken orders in the church but for the intense interest manifested by him in political questions. At the age of twenty-seven he received from Lord Somers, to whom he had dedicated a poem, a pension of $1,500, which enabled him to travel in Germany, France, and Italy for the purpose of study and investigation. At the death of King William III. his pension was discontinued, and he became so poor that he was compelled to live in a garret in the home of an acquaintance. His marked success in writing a poem in commemoration of the Battle of Blenheim attracted general attention, and he was appointed to the office of the commissioner of appeals, after which he entered permanently into politics. In 1708 he was elected to Parliament, in which body he held a seat until his death. He is celebrated chiefly for his essays contributed largely to the *Tattler, Spectator,* and *Guardian,* periodicals then generally read. These include the delightful series published in the *Spectator,* of which he made *Sir Roger de Coverly* the central figure. His production of greatest popularity is the "Tragedy of Cato," which was translated into various European languages. His writings were fully up to the standard which he constantly held in view; "to enliven morality with wit, and to temper wit with morality." The indescribable charms of his productions can never fail to interest the man of refined taste and cultured piety. Among his writings are "Dialogue on Medals," "Travels," "The Campaign," "Drummer," and "Rosamond."

ADDRESS, Forms of, the formal manner of beginning a communication, either written or spoken. In countries where rank and title prevail the forms of address are quite complex and adherence to them is considered necessary. Common usage has established some form of address even in republics, though in such countries they are less varied and numerous. "His Excellency, the President of the United States," is the form of address sanctioned by law that is to be applied to the President of the United States, and the same form is used in addressing the governors of states and ministers to foreign countries. Senators and representatives of the United States, or of the several states, judges, and consuls are addressed *The Hon.* ——, while the form of addressing the Vice-President is *The Hon.* ——, *Vice-President of the United States.* The following table gives a list of the more important addresses used in Great Britain, its dependencies, and most countries in which the personages are recognized:

Archbishop: *His Grace the Lord Archbishop of* ——
Baron: *The Right Hon. Lord* ——.
Bishop: *The Right Rev. the Lord Bishop of* ——.
Countess: *The Right Hon. the Countess of* ——.
Duchess: *Her Grace the Duchess of* ——.
Duke: *His Grace the Duke of* ——.
Earl: *The Right Hon. the Earl of* ——.
King: *His Most Gracious Majesty the King.*
Knight: *Sir* ——.
Lord Lieutenant (of Ireland): *His Excellency the Lord Lieutenant.*
Lord Mayor: *The Right Hon. the Lord Mayor.*
Marchioness: *The Most Hon. the Marchioness of* ——.
Marquis: *The Most Hon. the Marquis of* ——.
Members of Parliament: The letters *M.P.* are added to their usual address.
Prince: *His Royal Highness the Prince of* ——.
Princess: *Her Royal Highness the Princess of* ——.
Privy Councilor: *The Right Hon.* ——.
Queen: *Her Majesty the Queen.*
Viscount: *The Right Hon. Viscount* ——.
Viscountess: *The Right Hon. Viscountess* ——.
Youngest son of Duke or Marquis: *The Lord* ——.
Youngest son of Earl or Viscount: *The Hon.* ——.

ADE, George, author, born in Kentland, Ind., Feb. 9, 1866. He graduated at Purdue University in 1887. In the same year he engaged in newspaper work in Lafayette, Ind., and in 1890 became connected editorially with the *Chicago Record.* His contributions to newspapers were largely sketches of street life. His "Fables in Slang" is a work in two volumes, characterized by humor and discernment of human feelings. Among his popular comedies are "The County Chairman," "The College Widow," and "Just Out of College." Other writings from his prolific pen embrace "Peggy from Paris," "The Sultan of Sulu," "People You Know," "The Girl Proposition," "Breaking Into Society," and "True Bills."

GEORGE ADE.

ADELAIDE (ăd'ẹ-lād), an important city of Australia, about six miles southeast of Saint Vincent's Gulf, in the province of South Australia, of which it is the seat of government. The Torrens River divides it into South Adelaide and North Adelaide, the two divisions being connected by extensive bridges, and the stream is beautified by dams and dikes. There are excellent botanical gardens, which cover an area of 120 acres and may be classed among the finest in the world. Besides substantial government buildings, it contains telegraph, telephone, and railway offices, and is the seat of fine schools and churches. The city has a number of institutions of higher learning, including commercial schools, colleges, and a university. Port Adelaide, its port, has a commodious harbor and is protected by two forts. The manufactures include clothing, leather, woolen goods, ironware, machinery, tobacco products, furniture, and earthenware. It has an important commercial trade, both locally and with foreign countries. Among the municipal improvements are gas and electric light, street railways, pavements, waterworks, and other modern conveniences. The city was founded in 1836, and named in honor of the queen of William IV. Population, 1901, 39,200, including suburbs, 162,200; in 1922, 261,660.

ADELER, Max. See **Clark, Charles Heber.**

ADELPHI COLLEGE (ȧ-dĕl'phi), an institution of higher learning in Brooklyn, New York City. It was incorporated in 1896 by the regents of the University of the State of New York, and with it is affiliated Adelphi Academy, a school founded in 1869. Adelphi College has a student body of about 550 and a corps of instructors numbering 42. The library has over 17,500 volumes; the endowment approximates $1,000,000. The courses are grouped under three divisions: History and

Philosophy, Language and Literature, and Mathematics and Science. In connection with the college a flourishing normal school of kindergarteners is maintained. This offers a two years' course, which leads to a special course in kindergarten work.

ADEN (ä′dẹn), a seaport city and territory of Southwestern Arabia. The city forms an important commercial center owing to the increasing trade through the Suez Canal. Over 2,000 vessels stop at the port of Aden annually. The import trade amounts to over $17,000,000 annually and is slightly greater than the export trade. As a naval and coaling station it is quite important, and there are strong fortifications. The government is administered by an English local resident. Population, 43,974.

ADEN, Gulf of, an inlet from the Indian Ocean, located between Arabia on the north and the African peninsula of Somaliland on the south. Its length is 500 miles, extending from the Strait of Bab el Mandab to the Indian Ocean. It is also called the Arabian Gulf.

ADENOIDS (ăd′ē̇-noids), an excessive growth between the nose and the throat, consisting of a spongy tissue, causing difficulty in breathing through the nose. Children affected by adenoids suffer both mentally and physically. They usually have enlarged tonsils, sleep with the mouth wide open, and suffer from under-development of the chest, caused by lack of vigorous breathing. The treatment consists of removing the adenoids by a skilful physician.

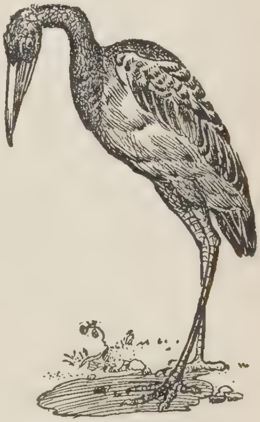
ADHESION (ăd-hē′zhŭn), in physics, the force that holds together molecules of different kinds. It is distinguished from cohesion, which is a force that holds together molecules of the same kind, acting at insensible distances. Adhesion takes place between two solids, between a solid and a liquid, or between a solid and a gas, but acts only at insensible distances. It differs from chemical affinity in that it acts between surfaces of any size without changing the character of adhering bodies, while chemical affinity acts between particles of substances and generally changes the appearance.

ADIGE (ä′dē̇-jā̇), (German, Etsch), a river of northern Italy, which rises in the Rhaetian Alps, flows in a southeasterly direction, and discharges into the Adriatic Sea. It forms the boundary between Lombardy proper and the old Venetian territories. It is 240 miles long. The valley of the Adige was the scene of much military action in 1917, between the Allies and the Austro-Germans.

ADIRONDACK (ăd-ĭ-rŏn′dăk), a group of mountains belonging to the Appalachian system, located between Lakes Ontario and Champlain, in northern New York. The region is a popular resort for tourists and sportsmen, who delight to spend the summer season among its mountain scenery, beautiful parks, and picturesque lakes in pursuit of game or in pursuing the pleasures of vacation. There are very complete provisions for pleasure and profitable pastime. Owing to the altitude, the nights are cool and the days generally pleasant. Mount Marcy is the most remarkable and the highest peak; height, 5,337 feet.

ADJECTIVE (ăd′jĕk-tĭv), the part of speech used to describe or define the meaning of a noun or a word or phrase equivalent to a noun. Adjectives may be divided into two general classes, descriptive and definitive. Descriptive adjectives describe the meaning of a noun by denoting some quality, as *square, round, sour,* while definite adjectives define the meaning or application without expressing quality, as *that* man, *the* Ohio, *the third* seal. The articles *a, an,* and *the* are sometimes included with the latter class. Adjectives that express quality admit of comparison, and are said to be either positive, comparative, or superlative in expressing different degrees of quality. In the English langauge the adjective precedes its noun, except when used as a predicate adjective.

ADJUTANT (ăd′jū̇-tant), or **Argala,** a large wading bird of the stork family found in the tropical parts of India. It has a large beak, a pouch hanging from the under side of the neck, and when standing erect is about five or six feet in height. The general color is an ashen gray mixed with white. At the apprehension of danger it inflates the large pouch in front of the neck with air, which is capable of considerable distention. In India it is protected by law, owing to its value in devouring carrion, reptiles, and offals. The adjutant bird is allied to the marabou of Western Africa, and, like it, furnishes from under its wings the light downy feathers known in the market by the name marabou. There are a number of different species, that of Senegal being an allied bird to those found in Southern Asia.



ADJUTANT BIRD.

ADLER, Felix, educator and reformer, born in Alzey, Germany, Aug. 13, 1851. His father was a Hebrew rabbi in New York City, to which place the family removed in 1857. He graduated at Columbia College in 1870, studied economics and philosophy at the universities of Berlin and Heidelberg, and in 1874 became professor of Hebrew and Oriental literature at Cornell University, holding that position till 1876, when he organized the Society of Ethical Culture in New York City. He contributed to many periodicals and published "Creed and Deed," "Moral Instruction of Children," "Marriage and Divorce," "Life and Destiny," and "The Essential Difference between the Ethical Societies and the Churches."

ADMETUS (ad-mē'tus), in mythology, a king of Thessaly. Being dangerously ill, the oracle declared that he must die, unless some person would voluntarily take his place, which was done by his wife, Alcestis. After her death, Hercules visited Admetus, and promised to restore his wife, which he did, forcing Pluto to give her up. The story is the subject of a celebrated drama by Euripides.

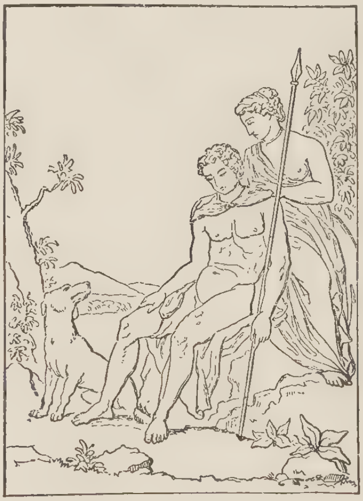
ADMIRALTY (ăd'mĭ-ral-tȳ), the name usually applied to the department of government which is at the head of the naval service. Most maritime nations maintain departments of admiralty, and from them charts are issued for aid in navigation. The United States Coast Survey details information of value in the naval service by issuing annual reports. Admiralty courts are peculiar to many European countries, and take cognizance of civil and criminal causes of a maritime nature. In Great Britain a board of admiralty comprises five lords commissioners, who decide on all important questions collectively, but each commissioner also has special duties assigned to him, such as naval discipline, sailing orders, purchase and disposal of stores, manning the navy, etc. In the United States the jurisdiction of the district courts embraces all civil and criminal cases arising in the maritime service. However, the graver and higher crimes are referred to the circuit courts as courts of admiralty. In Canada the exchequer court is a court of admiralty and has rights and remedies in all matters arising out of or in connection with navigation and commerce.

ADMIRALTY ISLAND, an island off the northwest coast of North America, belonging to the United States. It is about eighty miles long and twenty miles wide. There are forests of considerable value, but the climate is cold and the inhabitants consist chiefly of Sitka Indians. Killisnoo, located about forty-five miles northeast of Sitka, is the chief town.

ADMIRALTY ISLANDS, a group of about forty islands lying northeast of New Guinea. The group constitutes a part of the Bismarck Archipelago. These islands were discovered by the Dutch in 1616, and belonged to Germany, but were placed under the government of Australia in 1920. They produce fruit, fish, rice, and domestic animals. The inhabitants consist chiefly of tawny-colored islanders.

ADOBE (ȧ-dō'bȧ), a name of Spanish origin applied to brick made of a mixture of sand and clay and sun-dried. Buildings constructed of this kind of material are quite common in arid and semi-arid districts of North America, especially in New Mexico, Arizona, and Central America. In size these brick vary somewhat, the usual dimensions being 4 by 12 by 16 inches. The material is thoroughly mixed and exposed for drying to the sun about two weeks, during which time they are turned daily, though the treatment varies somewhat with the condition of the atmosphere and the season of the year. Brick of this kind cannot be used where rainfall is abundant as they will not bear a considerable amount of moisture. The Egyptians and Babylonians constructed buildings of this class of material, or used brick made of clay mixed with straw and baked in the sun. In some sections where building material is scarce, as in portions of the plains of America, sod is used to lay up the walls and an adobe soil is mixed with sand for plastering both the exterior and interior. Sod houses treated in this way are quite serviceable, especially if the floor and roof are constructed of lumber.

ADONIS (a-dō'nĭs), in Greek legend, a beautiful youth that attracted the love of Venus and Proserpine, who quarreled about the possession of him, but the difficulty was finally adjusted by Jupiter deciding that each should enjoy his presence for one-half the year. Being fond of hunting and engaging frequently in it as a pleasure and pastime, he was killed eventually by a wild animal in the forests of Ida. The great sorrow of Venus moved the gods to allow Adonis to visit the upper world six months of each year, which led to annual festivals in his honor in the countries bordering on the Mediterranean Sea. These festivals consisted of two parts, rejoicing for his return and mourning for his departure. It is believed that Adonis represented the sun, and his return and departure the change of seasons.



ADONIS AND VENUS.

ADONIS, a genus of herbaceous plants native to Europe and belonging to the same family as the buttercup. The corn-adonis grows as a weed in the wheat fields of Great Britain and has become naturalized in some parts of the United States. Several species of the adonis are cultivated as garden plants, and in these the petals are a bright scarlet.

ADRIAN (ā'dri-an), a city in Michigan, county seat of Lenawee County, seventy miles southwest of Detroit, on the Wabash, the New York Central, the Toledo and Ironton, and other railways. It has a considerable jobbing trade and manufactures of street and railway cars, furniture, brick, wire, machinery, and earthenware. It is the seat of Adrian College, established in 1859 by the Methodist Church for the coeducation of the sexes. The city has fine public schools, an excellent county courthouse, an opera house, and a Masonic temple. Gas and electric lights, waterworks, pavements, and sewerage are among the improvements. It was incorporated as a city in 1853. Population, 1920, 11,878.

ADRIAN, the name of six popes of Rome, who reigned between 772 and 1523. Adrian I., the friend of Charlemagne, ruled from 772 to 795. Adrian II. was elected Pope at the age of seventy-five years, and served from 867 till 872, dying in the latter year. Adrain III. was Pope for one and one-third years, being elected in 884. Adrian IV, was by birth an Englishman, the only personage of that nationality who ever sat in the papal chair; born in 1100; elected Pope in 1154, and died in 1159. Adrian V. died in 1276, a month after his election to the papal chair. Adrian VI., born at Utrecht in 1459, was elected Pope in 1522, and died in 1523. See **Pope**.

ADRIANOPLE (ăd-ri-an-ō'p'l), the second city of the Turkish Empire, capital of the vilayet of the same name, 130 miles northwest of Constantinople. It was founded by Hadrian on the Hebrus River, now called Maritza River. The city was the capital of the Turkish Empire from 1361 to 1453, but in the latter year the capital was removed to Constantinople. In 1829 it was occupied by the Russians, and also in the War of 1878. Its improvements include a splendid aqueduct, several elegant mosques, and other religious and educational institutions. There are manufactures of silk and woolen goods, cotton textiles, leather, tobacco products, and machinery. It has railroad connections with Constantinople and other important cities, and enjoys a large trade. The inhabitants are chiefly Bulgars, Jews, and Turks. It was captured by the Balkan allies in 1913. Population, 1920, 83,250.

ADRIATIC SEA (ăd-rē-ăt'ĭk), an extension of the Mediterranean Sea in a northwesterly direction from the Strait of Otranto, lying between Italy, Austria, Montenegro, and Turkey. Its greatest length is 480 miles; average breadth, 100 miles, and area about 60,000 square miles. Into it flows the Po River, which is producing notable geological changes by alluvial deposits. The sea was so named from Adria, which was once an important seaport, but is now seventeen miles inland, owing to the deposits of silt from the tributary rivers, the Po and Adige. The most important seaports include Trieste, Sinigaglia, Ancona, and Venice.

ADULLAM (a-dŭl'lam), one of the cities of the plain, in the tribe of Judah, fortified by King Rehoboam. The Cave of Adullam, where David hid when pursued by the Philistines, was probably near the Dead Sea. (I Sam. xxii, 1-2).

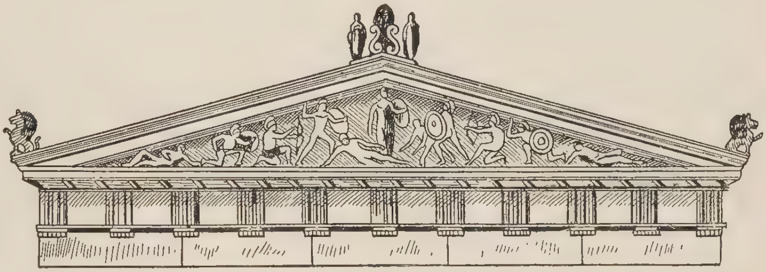
ADULTERATION (ȧ-dŭl-tẽr-ā'shŭn), a term used to designate the debasement of a pure or genuine article by taking away some of its constituent parts, or adding to it some inferior article. The object of adulterations is usually for pecuniary profit, and has prevailed in all countries from ages far remote. It has been the subject of legislation, governments seeking thereby to protect the consumers of such products from deception by manufacturers and salesmen in many articles of commerce, particularly articles of food. Various European nations legislated regarding it as early as the 13th century, but none of the efforts have been more than partially successful. In the United States legislation has varied, but has been enacted more particularly by the states than the nation. Among the national laws is one regulating the sale of oleomargarine, an artificial form of butter.

The most common form of adulteration is the addition of a substance of little value to one of greater value, the design being to increase bulk and weight of different commodities, as mixing chicory with coffee, fat with butter, and water with milk. Fictitious value is often given to substances by improving the appearance or heightening the color, as coloring butter or pickles, or mixing salts of copper with preserves. Impurities are also frequent when it is designed to increase the flavor, as adding sulphuric acid to vinegar, while ingredients are often added to beverages to increase the thirst of the consumer, as the adulteration of beer by the addition of salt. While adulteration of food articles is quite common, it is not practiced so extensively as the public believe. As a rule the consumer of adulterated foods is more likely to sustain unnecessary expense than suffer a loss of health, yet many of these adulterations are extremely harmful, vicious in principle, and in direct violation of public policy.

ADVENTISTS (ăd'vĕnt-ĭst), the name assumed by a Christian denomination, among whose tenets is the belief in the second advent of Christ. Several branches have sprung from the teaching of William Miller, who prophesied that the world would come to an end in 1843. They differ more or less in points of doctrine, but the government is uniformly congregational. The Seventh-Day Adventists constitute the most numerous branch. They support sixty educational institutions, issue numerous publications, and have a membership of 160,422 communicants, including 920 ministers. The denominational headquarters are at Washington, D. C. The smaller denominations include the Evangelical Adventists, the Advent Christians, and the Church of God.

ADVERB (ăd′verb), in grammar, a word used to modify the meaning of a verb, adjective, participle, or an adverb. Adverbs are divided into five classes: adverbs of *time, place, cause, manner,* and *degree.* Most English adverbs are formed by adding the suffix *ly* to an adjective or its root, though many are not thus formed. A sentence or part of a sentence is frequently used to perform the function of an adverb. Many adverbs are compared by the use of *more* and *most.*

ADVERTISING (ăd-vẽr-tīz′ĭng), the method by which the sale or exchange of commodities is made known to the public. Advertising is not confined to the producing class, though this was originally the case, and the means to make known through publication the value and price of articles offered are very various. Many standard products useful in domestic economy are advertised on billboards, both in city and country, and in all the larger cities companies promote advertising in this way as a regular business. However, the greatest amount of advertising is done by circulars, catalogues, and through the columns of magazines and newspapers. The amount of money paid annually for advertising in the Dominion of Canada is estimated at $80,000,000, while in the United States the annual expenditure for this purpose is placed at $720,000,000.



TEMPLE OF ATHENA: WESTERN GABLE.

The history of advertising may be traced to ancient times, especially to Greece and Rome, where signs were utilized to make announcements and criers gave information in regard to the value and price at which commodities were for sale at particular places. However, the invention of printing revolutionized advertising as a business, and at present there is scarcely a large periodical whose columns are not open to all classes of legitimate advertising. Indeed, the receipts from advertising in numerous classes of periodicals, especially magazines, are an important factor and in many cases exceed the money received for subscriptions. The value of modern advertising has secured such a hold upon business men and the public that success in almost any line depends in a great measure upon the manner of advertising. The theory and practice of writing advertisements is a branch of study placed in the curriculum of many schools and business colleges.

ADZ (ădz). See **Ax.**

AEGEAN SEA (ê-jē′an), a branch of the Mediterranean Sea extending west of Asia Minor, south of Turkey, and east of Greece. Its breadth is 200 miles, and the average length 400 miles. Within the sea are a number of fertile islands, many of which are cultivated in the production of cereals and fruit. They include Euboea, Lesbos, Lemnos, and Samos.

AEGINA (ê-jī′na), a small island belonging to Greece, situated in the Gulf of Aegina, and containing an area of about thirty-two square miles. The island is mountainous and sterile, except in the western portion, which is quite level and productive. The chief products include olives, almonds, grapes, and cereals. On the island are remains of the temple of Athena. In ancient times, about 256 B. C., the island belonged to the Athenians. Population, 9,135.

AEGIS (ē′jĭs), the shield of Jupiter and Minerva, which was covered with the skin of the goat Amalthea, by which Jove was nourished in infancy. According to Homer, Jupiter had but to shake the shield to cause thunder and lightning to descend upon earth.

AEGOSPOTAMI, or **Patamos,** a locality in the Thracian Chersonese, on the Hellespont, where the Spartans under Lysander defeated the Athenian fleet. This defeat, in 405 B. C., ended the predominence of Athens and brought the Peloponnesian War to a close.

AENEAS (ē-nē′as), in Greek legends, the son of Anchises, a prince of Troy, and of the goddess Venus. It is related that he married Creusa, the daughter of King Priam, that he was the bravest Trojan next to Hector, was beloved by men and gods, and, after the fall of Troy, carried his aged father from the city, while at the same time leading his son by the hand. He first sought refuge on Mount Ida, but soon built a fleet with which to sail to Carthage. Queen Dido extended a warm welcome to his company, and he later contemplated marrying her, but was warned by the gods and advised to seek a new home in Italy. His departure from Carthage so grieved Queen Dido that she killed herself and was placed on the funeral pyre, but even this was turned to the advantage of Aeneas, since the ascending flames lighted his departure. With his fleet of twenty ships he visited many islands in the Mediterranean, but finally landed on the shores of Italy and sailed up the Tiber, proceeding up that river until he reached the country governed by King Latinus. He was not only kindly received, but married Lavinia, the daughter of the king, founded the city of Lavinium, and became the ancestral hero of the Roman people. He succeeded Latinus as king of Latinum, and died in battle against the Etruscans. He was succeeded by his son Ascanius, who founded the city of Alba Longa. King Numitor was a descendant from Aeneas, as also was Romulus, the founder of Rome. Æneas was made the hero of the "Aeneid," a poem written by Virgil.

AENEID (ê-nē'id), the great epic poem written by Virgil, which ranks with the "Iliad" and "Odyssey," and is classed as one of the three greatest poems bequeathed to posterity by the ancients. It was commenced about the year 30 B. C., and was left unfinished at the time of the author's death. Virgil thought it of too little merit for publication and directed that his friends burn the manuscript, but Emperor Augustus saved it and gave it into the hands of two learned friends of the author for publication. The fact that many lines were left unfinished is proof that the poem was not carefully revised by the author.

The story of the Aeneid relates the adventures of Aeneas after the fall of Troy and his final settlement in Italy, where he and his followers became the founders of Rome. This writing consists of twelve books. The first accounts that Aeneas was driven by a storm on the coast of Africa, where he was hospitably entertained by Dido, queen of Carthage, to whom he related the story of the fall of Troy. His wanderings from Troy to Carthage are told in the second and third books. In the fourth book the poet relates the story of the passion conceived by Dido for her Trojan guest, the departure of Aeneas in obedience to the will of the gods, and the suicide of Dido. The visit to Sicily and the burning of the ships are described in the fifth book, while the sixth deals with the landing of Aeneas at Cumae in Italy and his descent to the infernal regions, where he saw his father, Anchises, and had a vision of the future glories of his race and the greatness of Rome.

While the first six books are modeled upon the "Odyssey," the six last books partake of the spirit of the "Iliad." They contain an account of the struggles of Aeneas in Italy, his alliances with Latinus, king of Latium, and his projected marriage with Lavinia, daughter of Latinus. The last volume closes with the fall of Turnus, king of the Rutuli, by the hand of Aeneas, and the projected marriage is left uncompleted. Virgil asserts that the Julian family of Rome descended from Aeneas, and traces the connection between him and Augustus Caesar, in whose honor the poem was written.

AEOLIAN HARP(ē-ō'lĭ-an), a harp played by Aeolus—that is to say, by the wind. It consists of a wooden sound-box with strings of catgut stretched over it. When exposed to the action of the wind, it produces a succession of pleasing sounds, bold when the breeze is forceful, but plaintive when slight. The invention was made by Athanasius Kircher (1601-1680), a German Jesuit of the 17th century.

AEOLUS (ē-ō'lŭs), in Greek mythology, the god of the winds. He was the ruler of the Aeolian Islands, a group of islands lying between Sicily and Italy, and now called Lipari Islands. Virgil in his "Aeneid" relates that Aeolus had the winds confined in caverns in the mountains, and that they were permitted to leave only with his consent.

AËROLITE (ā'ĕr-ô-līt), one of a class of meteorites, shooting stars, or meteoric stones which fall from the sky and generally, but not always, reach the earth. They are usually subangular, with the angular points rounded off, and generally reach the ground in an incandescent state. They usually contain quantities of malleable iron, nickel, magnesia, sulphur, alumina, lime, carbon, and other substances. The constituents are always the same as substances found in the earth, but the combination differs widely in different aerolites. Their origin is the same as that of meteors. See **Meteor.**

AËRONAUTICS (ā-ĕr-ô-nạt'ĭks), the science that treats of aërial navigation. It embraces the two departments of pneumatics known as aërostatics and aërodynamics and involves the subject of fluid-friction and the resistance of the fluid to the motion of a solid body passing through its mass. Balloons, flying machines, and all other forms of apparatus used in aërial navigation are studied under this branch of science, which is a subject of growing interest. See **Balloon, Flying Machine.**

AËROSTATICS (ā-ĕr-ô-stăt'ĭks), the department of science which treats of gases at rest, that is to say, with their particles at equilibrium. Aërodynamics treats of the phenomena observed when the forces acting within or upon aëriform fluids produce motion, while aërostatics is confined to the relations of forces acting in or upon such fluids when no motion results. Both these are departments of pneumatics.

AËROSTATIC PRESS, a machine used for extracting by atmospheric pressure the coloring matter of dyewood and other materials, such as leaves, insects, etc. The material from which the color is to be extracted is placed in a vessel between two horizontal partitions pierced with small holes. An air pump, by which the air can be withdrawn, is placed at the bottom and the liquid to form the extract is poured on the top. When the suction pump is operated, the liquid is forced by the pressure of the air from the top through the material, carrying with it in solution the liquid coloring matter.

AESCHINES (ĕs'kĭ-nēz), an eminent Greek orator and rival of Demosthenes, born in Athens, 389 B. C.; died in Samos, 314 B. C. His native gift of eloquence and knowledge of the law, combined with a distinguished appearance, caused him to become prominent in public life. In 342 B. C. he was sent to Philip of Macedon as a member of an embassy which favored an alliance with Philip, while Demosthenes opposed him at every point in the movement. He withdrew from Athens in 330 B. C., after failing in a prosecution against Ctesiphon for proposing to reward Demosthenes with a golden crown for his services to the state. Subsequently he opened a school of oratory at Rhodes, where he wrote orations and taught philosophy. His three orations known as "The Three Graces" are his chief productions. They are entitled "Against Ctesiphon," "Against Timarchus," and "On the False Embassy."

AESCHYLUS (ĕs'kĭ-lŭs), a celebrated poet, the originator of Greek tragedy, born in Eleusis in 525 B. C.; died at Gela in 456 B. C. Little is known of his life, but it is thought that he was of noble birth and a descendant of Codrus, the last king of Athens. He was not only an able writer of dramatic poetry, but took a prominent part in the defense of Athens against the Persian invaders. He fought in the battles of Marathon, Salamis, and Plataea, and shared in the exulting sentiments which pervaded Greece after the fall of Darius and Xerxes. While he wrote about eighty tragedies, only seven have been preserved. These include "Prometheus Bound," "The Seven Against Thebes," "The Persian," "Agamemnon," "The Choephori," "Eumenides," and "The Suppliants." He was the first to introduce action in tragedy in place of chorus, and dramatic dialogue to supersede long narrations; masks, dresses, and scenic effects were also first suggested by him. While a number of tragedies written by Aeschylus are historical in character, he drew inspiration largely from myths and legends. He gained thirteen prizes for tragedies, but was at last defeated in the competitive contest by Sophocles, and left Greece to make his home with Hiero, the tyrant of Syracuse. It is doubtful whether he ever revisited his native city.

AESCULAPIUS (ĕs-kŭ-lā'pĭ-ŭs), in Greek mythology, a skillful physician of human origin, but in later Greek legends designated the god of medicine. He was ultimately adopted by the Romans, who regarded him in their legends as the son of Apollo. In some legends he is credited with not only healing the sick, but it is asserted that he so successfully called the dead to life that Pluto, the king of Hades, found his kingdom rapidly depopulating. He accordingly appealed to Jupiter, who struck Aesculapius with a thunderbolt. He was worshiped with marked fervor at Epidaurus, the Grecian town of his birth, where a fine temple was built to his honor. In this temple was a peculiar breed of snakes, into whose body the gods were supposed to pass. When an epidemic afflicted a region or city, it was customary to send to Epidaurus for a snake. The priests of the temples of Aesculapius were the only physicians of ancient Greece and Rome. They were called Aesclepiades, or sons of Aesculapius.

AESOP (ē'sop), an ancient Greek writer whose name is attached to a large collection of fables. He is regarded a myth by many authorities, and the origin of the fables that bear his name are accredited to various writers of different ages. Herodotus and Plutarch assign Aesop to the sixth century B. C., and regard him a contemporary of Croesus and Solon. He is said to have been a slave at Samos, and, when freed by his master, was sent to Delphi by Croesus to distribute some money among the citizens of that city, which he not only refused to pay, but enraged the citizens with sarcasm and was thrown over a precipice by an infuriated mob. Although claims are made to the contrary, it is quite certain that none of his works are extant. Maximus Planudes, a monk of the 14th century, collected popular stories which he designated "Aesop's Fables," and a complete collection of 231 Aesopean fables was published in Breslau, Germany, in 1810. From these two sources compilers of recent times have drawn much material.

AESTHETICS (ĕs-thĕt'ĭks), the science that treats of the beautiful and pleasing. The term owes its origin to various writers, but primarily to Alexander Gottlieb Baumgarten (1714-1762), who held that as truth is the end and perfection of knowledge, and good that of the will, so beauty should be the end of all sensuous knowledge. According to Herbert Spencer, the aesthetic feelings have this characteristic, that they are not connected with the functions requisite to sustain life, and, for this reason, do not gain enough power to act until the functions necessary to sustain life have the proper scope.

The ancient Greeks, a people productive of noble and artistic creations, supply us with the first speculations on the culture of the beautiful and the aim of fine arts. They are gathered from poetry and paintings, and particularly from Plato's "Dialogues." However, Socrates was the first Greek scholar whose views on this subject are definitely known. From Xenophon's exposition of the views of Socrates we learn that the latter regarded the beautiful as coincident with the good, and both susceptible to conversion into the useful. It was thought that every beautiful object serves some rational end, whether the gratification or security of man. From the "Dialogues" it may be concluded that Plato held to the theory of an absolute beauty. He tells us in the "Symposium" how love produces inspiration toward the pure idea of beauty. To his mind the only beauty that deserves the name is absolute beauty; that absolute beauty is beautiful in every respect, and the foundation of all beauty. Many modern writers agree that a delight in sculpture, poetry, music, the drama, painting, and even fine mathematical demonstrations is a source of the aesthetic growth. Kant held the view that the beautiful is the harmony between the imagination and the understanding, and this view is supported by a number of modern philosophers. Richter, Schlegel, Ruskin, Lessing, Hegel, Helmholtz, and Schelling are among the best known writers to contribute scientific treatises on aesthetics.

AETNA. See **Etna.**

AETOLIA (ē-tō'lĭ-ȧ), a division of ancient Greece, bounded on the west by the Acheloüs River, on the north by Thessaly and Epirus, and on the south by the Gulf of Corinth. Along the northern part extends the range of Mount Pindus. In the time of Pericles the Aetolians were warlike and barbarous, but they became famous during the Macedonian wars and for their bravery in resisting the invasion of their country by the Gauls. Aetolia and Acarnania were united and now constitute a monarchy of Greece. The area is 3,013 square miles.

AFFIDAVIT (ăf-fĭ-dā'vĭt), a legal document affirmed or sworn to before some authorized officer. A document of this kind is made without cross-examination and is much used in making various motions in court. It is customary to procure and place on record an affidavit to prove or correct conveyances of personal and real property.

AFFINITY (ăf-fĭn'ĭ-tȳ), in law, the marriage relationship contracted between the husband and his wife's kindred, and between the wife and her husband's kindred. Marriage is forbidden by law in some countries between persons who are related by affinity within the third degree, which is the case in Great Britain, and this is considered in accordance with the Scriptural injunction.

AFFINITY, in chemistry, the force by which union takes place between two or more elements to form a chemical compound, and which constitutes the force that produces all chemical phenomena. Unlike attraction of gravity, it does not act upon masses, but between atoms, and only when the atoms are at insensible distances. It differs from cohesion in that it unites atoms of different substances, while cohesion unites the particles of similar substances. The compounds formed by affinity are new bodies, often bearing no likeness in appearance or other properties to the elements by which they were produced, as water results from the union of two gases, hydrogen and oxygen. The strength of chemical affinity differs between different substances. Gypsum is formed by a combination of sulphuric acid and lime, but, if potash be added, the sulphuric acid repels the lime and unites with the potash. Affinity is dependent upon circumstances, such as the presence of light and a change of temperature. An increase of temperature has the effect of diminishing affinity in some substances and promoting it in others, and, when highly heated, the constituents of some compounds are separated. Heat is evolved by a combination of two elements in forming a compound, the amount evolved being termed a measure of affinity.

AFGHANISTAN (ȧf-găn-ĭs-tăn'), a country in the southwestern part of Asia. Its boundaries are formed by India, Turkestan, Persia, and Baluchistan; the last named separates it from the Arabian Sea. The area is estimated at 280,000 square miles, and the population at 5,125,000. Its four provinces are Kabul, Kandahar, Herat, and Turkistan, and it includes the Badakhshan district. Kabul, in the east-central part, is the capital. Other cities of note include Kandahar, Herat, and Ghuzni.

Physical Features. The region is mostly a mountainous country, including lofty uninhabited tablelands, barren plains, and numerous productive valleys. In the northern part are lofty ranges of the Hindu Kush Mountains, of which Mount Hindu Koh is the culminating peak, its snow-covered summit towering about 22,300 feet above sea level. The northern part is drained by tributaries of the Amu or Oxus River, while the southern and central sections drain westward by the Helmund into Hamoon, a salt-water lake. Though the climate is of a continental nature, the differences in elevation and unequal distribution of rainfall render it various. In the desert oases thrives the date palm; cotton is cultivated in the sheltered valleys, while the elevated regions are exposed to severe cold and heavy fall of snow.

Productions. The chief industries are agriculture and stock-raising. The soil fit for cultivation is generally fertile and yields wheat, corn, rice, millet, barley, vegetables, and fruit. Much of the farming depends upon irrigation, and the supply of water is drawn by means of short canals from rivers and mountain streams. It has manufactures of carpets, silk and woolen goods, and utensils used locally. A mint and ammunition factory are operated at Kabul. The country has many minerals, but there is little mining, and the methods of farming have been little improved in the past decade. Cattle, sheep, horses, goats, and the dromedary are the principal domestic animals.

Government. The government of Afghanistan is a monarchy, semi-feudal in form, and the chief ruler is known as the ameer, who is a hereditary prince and whose power is absolute. Habib Ullah, the present ruler, has given encouragement to the construction of canals for irrigation, and has fostered the building of highways, bridges, and fortifications. Railroad and telegraph construction were long excluded on the ground that it is opposed to public policy, and trade is still carried on largely by camels and ponies, though wheeled vehicles are employed where highways have been built. India and Russia have had most of the trade, and both countries operate railway lines to the boundary, Russia from Merv on the north and the English through British Baluchistan on the south. Foreign enterprise has resulted in the construction of railways to some of the chief commercial cities, and there has been a perceptible extension of export and import trade. Most of the industries, particularly manufacturing, are in the hands of Europeans.

INHABITANTS. The word *Afghan* is of Persian origin, and the people themselves apply the term *Vilayet,* which signifies the original land of ancestors. The inhabitants are divided into numerous clans, of which the Ghilzais are the most numerous and the bravest. In their hands is the political ascendency, and they occupy the country between Herat and Kandahar. It is thought that the Tafiks are the aborigines. They speak a Persian dialect, are scattered over the whole country, and are a frugal, industrious class. The Hazaras are of Mongol type and occupy chiefly the mountains of the northwest. Afghans proper, who are allied in blood to the Persians, constitute the larger part of the inhabitants. In language they have retained the essential characteristics of the Iranic group of the Indo-Persian, but the spoken tongue is mixed with various Oriental dialects, and is written in Persian characters. The literature does not date back farther than the 15th century, and as a whole partakes largely of Persian features. Mohammedanism of the Sunnite sect is the chief religion, and much of the literature is based on the Koran.

HISTORY. The history of Afghanistan is an account of a mass of mixed elements held loosely together in one government. Most Afghans claim direct descent from King Saul and profess to be Bani-Israel, and their features show Jewish connection. The name was first found in the history of Sultan Mahmud, of the 11th century, and it is known that Alexander the Great reached India by the Kabul River. They were in the present country in the 13th century, and for a century and a half under Mongol rule, but later were under the dominion of the Persians. While the Persian people were in a state of discord, they attained independent power, and after the death of Nadir Shah finally became liberated from the Persian dominion by the Abdalli leader, Amed Khan, in the 18th century.

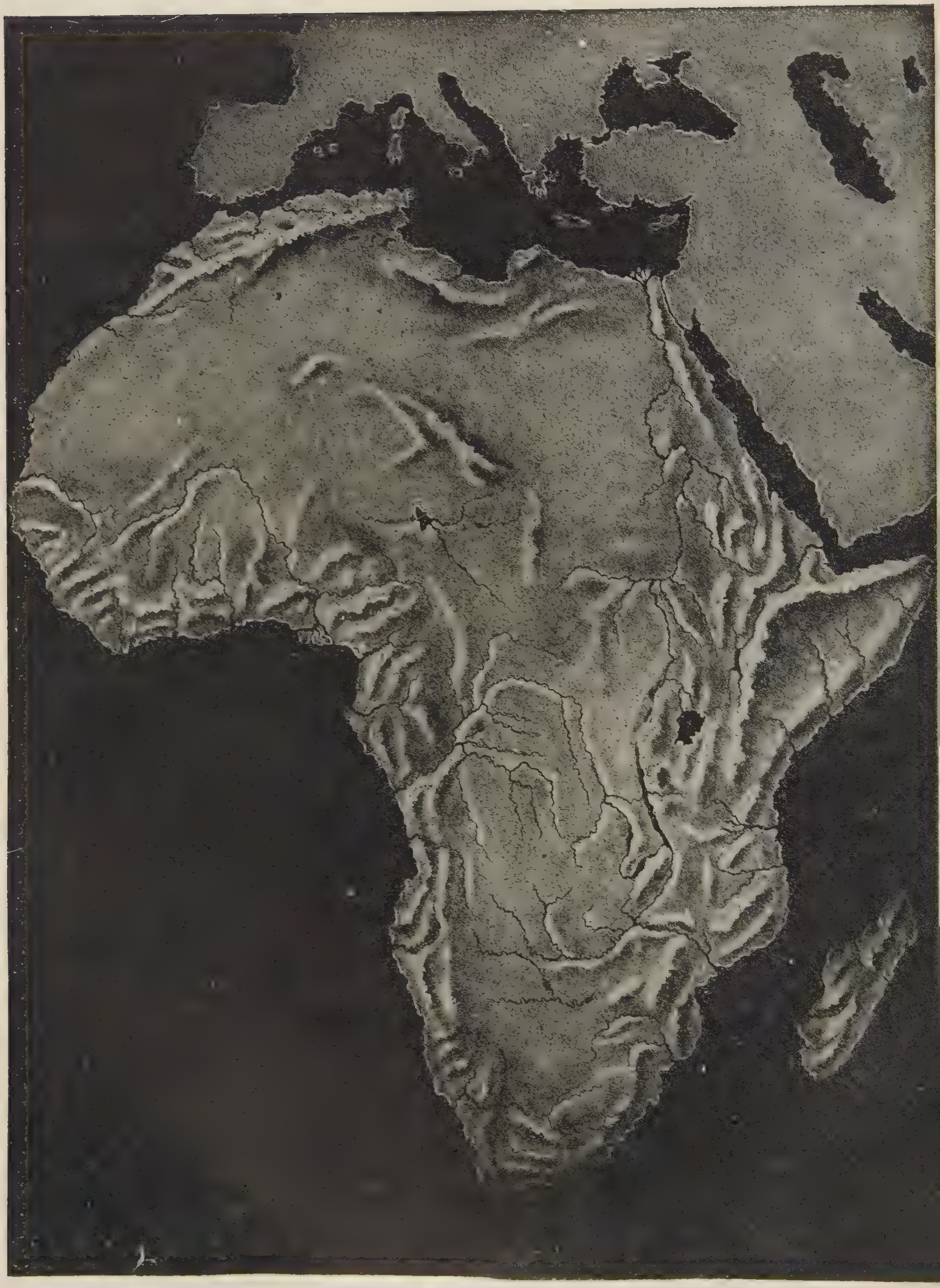
Dost Mohammed became ameer in 1826, having defeated Shah Suiah, who escaped to India and carried on futile intrigues to regain his sovereignty. In 1838 Afghanistan was invaded by a British army. Dost Mohammed lost his throne as a result of the invasion, but regained it two or three years later and reigned until 1863, when he was succeeded by Shere Ali Khan. A second British invasion occurred in 1878, when the ameer fled to Turkestan and was succeeded by his son, Yakub Khan, who concluded a treaty with the British and later with the Russians. Abdurrahman (q. v.) was accepted as ameer by the Afghan chiefs in 1880 and ruled successfully until his death in 1901. He was succeeded by his eldest son, Habib Ullah, who was assassinated in 1919 and was succeeded by his son, Amanullah, who, in 1926, assumed the title of king. In 1928 the king visited Europe, after which he organized the administration on modern lines, established public hospitals, and promoted compulsory education.

AFRAGOLA (ä-frȧ-gō'lȧ), a city in Italy, five miles southeast of Naples, with which it is connected by a railroad. It is noted for its manufactures of straw goods. Population, 1921, 22,419.

AFRICA (ăf'rĭ-ka), a grand division in the Eastern Hemisphere, the second in size of the grand divisions, being exceeded only by Asia. Its length from north to south is about 5,000 miles, and the greatest breadth across the Sudan is about 4,500 miles. The area comprises 11,514,985 square miles, about three times the size of Europe, and there is a coast line of fully 15,000 miles. The shape is that of an irregular triangle, with the vertex to the south. It is separated from Europe by the Mediterranean Sea, and from Asia by the Red Sea and the Gulf of Aden, and the only connection with other grand divisions is with Asia by the Isthmus of Suez, through which the Suez Canal has been cut. The eastern shore is washed by the Indian Ocean, and the western by the Atlantic.

OUTLINE AND ISLANDS. Among the larger gulfs and bays are the gulfs of Sidra and Cabes on the north; Suez, Aden, and Delagoa on the east; Algoa Bay on the south, and the Gulf of Guinea on the west. The more prominent capes include Bon and Blanco in the Mediterranean, Guardafui on the Atlantic, Cape of Good Hope and Agulhas on the southern extremity, and Capes Verde and Blanco on the western shore. The four capes of Guardafui, Agulhas, Verde, and Blanco (in the Mediterranean) are the extreme points of the grand division. Few important islands and groups of islands belong to Africa, the most important being Madagascar, which is separated from the continent by Mozambique Channel. Among the chief islands are the Cape Verde Islands, St. Helena, St. Thomas, the Canaries, Fernando Po, Madeira, Ascension, Mauritius, and Prince's Island.

PHYSIÇAL FEATURES. The surface of Africa is mostly elevated, but not lofty, only three mountain regions having their summits above the snow-line. The southeastern one-third of the grand division is an elevated plateau, sloping largely toward the northwest, with a central elevation extending from the equatorial lakes to the Strait of Gibraltar. It may be said that a generally elevated region extends from the vicinity of Mount Kilimanjaro to the Mediterranean shore in Algeria. On the seacoast,



RELIEF MAP OF AFRICA.

along both sides of the continent, are plains more or less clearly defined. The surface in the northwest of the northern elevation descends toward the Atlantic nearly to the sea level, while to the east of it are portions below the surface of the Mediterranean. From the Mediterranean Sea to the southern extremity of the continent, along the eastern coast, extends the predominating mountain system. It is most highly elevated near the center, on the plateaus of Kaffa and Abyssinia, and in the region extending between Lake Victoria Nyanza and the Indian Ocean. The highest points are the volcanic peaks of Kenia and Kilimanjaro, both situated east of Lake Victoria Nyanza, whose estimated heights are about 20,000 feet. The highlands extending southward from Kilimanjaro are known as the Drakensberg Mountains, which culminate in peaks 10,000 feet high, and extend southward to the Cape of Good Hope. The Abyssinian plateau has a general elevation of from 6,000 to 8,000 feet, the highest peaks being about 15,000 feet. In the south are the Snow Mountains, with peaks of over 10,000 feet; on the west the Mocambe and Crystal Mountains, extending from the south to the Gulf of Guinea, and north of these are the volcanic peaks of the Cameroons, with altitudes approximating 13,000 feet. Along the northern shore of the Gulf of Guinea extend the Kong Mountains, and in the extreme north of Africa are the Atlas Mountains.

Rivers and Lakes. Africa possesses some of the greatest rivers of the world, among them the Nile, 3,900 miles long, the Congo, 2,800 miles, and the Zambezi, Niger, Orange, Limpopo, Tana, Juba, and Senegal. The rivers have their sources largely in the equatorial regions, where moisture is abundant. There also are located the principal lakes, including Lakes Tchad, Victoria Nyanza, Nyassa, Albert Nyanza, Albert Edward, Bangwedo, Tanganyika, Tzana, and Leopold. The fertility of the lake region is equaled only by the equatorial regions of South America. In these regions of the two continents thrives the most luxuriant vegetation of the world. Both toward the north and south of the equatorial region of Africa the rainfall diminishes and vegetation gradually decreases, and dense forests give way to shrubs and grasses. To the north this region is known as the Sudan, while in the south is includes the grass country of the Zambezi River. Beyond these north and south lie deserts; the great Sahara on the north, and the Kalahari on the south. The extensive Sahara Desert (q. v.) is not a total sandy waste, but has a great variety of surface, rocky and mountainous in some regions, and level and fairly fertile in others.

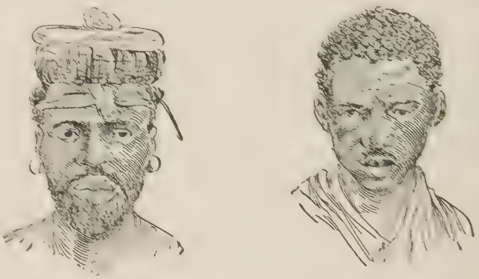
Productions. In the western part of Africa vegetation is extensive and quite varied, particularly along the northern shores of the Gulf of Guinea and in the region of the Gambia and Senegal rivers. The desert regions contain numerous fertile oases, where grows the date palm, a tree of vast value on account of its food product for the natives and their animals. In the equatorial region the banana is the chief product. A large variety of European agricultural products are cultivated on the shores of the Mediterranean, while ebony and fine cabinet woods abound in the forests. In the valley of the Nile agriculture is the chief occupation, but the methods are very primitive as compared with those prevailing in Europe and America. The soil is not plowed as in the highly civilized countries, but the work is done with rude machinery or the seeds are scattered and then trampled into the soil by oxen, though in some regions newer methods and machinery have gone into use. Extensive dikes and ditches have been built in many parts of the Nile valley, and other improvements have been made by which the water of the river may be utilized in irrigating the land. Southern Egypt contains some of the largest irrigation reservoirs maintained in the world, thus making it possible to utilize for agriculture and stock-raising areas formerly arid and sterile. The productions of this region include rice, cotton, corn, wheat, sugar-cane, live stock, and semi-tropical fruits. In the southern part of Africa agriculture, mining, and manufacturing have been developed largely by European people, who are rapidly introducing the modern appliances in all avenues of industry and civilized art.

Minerals and Trade. Africa is rich in all kinds of minerals, though its geology is not known sufficiently to form a reliable outline of the extent of its mineral wealth. Diamonds in the rough valued at about $460,000,000 have been taken out of the fields in the vicinity of Kimberley since they were opened in 1868. Coal deposits abound in the region of the Zambezi River and other sections. Johannesburg is the center of the gold fields, where mines were opened in 1883, and the annual product is valued at nearly $60,000,000. Iron, copper, lead, granite, and many excellent building stones are widely distributed. The ivory and rubber trade continues to be important, especially in the west central region lying along the Gulf of Guinea and inland from that section. Chief among the exports are ostrich feathers, gold, diamonds, wool, ivory, hides, and fruits. Machinery, textiles, farming utensils, and drugs are imported. The exports for 1923 are placed at $478,650,000, and imports at $510,584,000. Great Britain and Germany had the largest share of trade, but important trade relations are maintained with the United States, France, Holland, Portugal, and Italy.

Transportation. Railroad building is an important factor in the development of African trade, there being 15,450 miles in operation, and several thousand miles are projected and have been surveyed. The greatest single railway line projected is to extend from Cape Town to Cairo, a distance of 6,600 miles. One-half of this line is completed, and the entire enterprise is expected to be finished by the year 1930. From Cape Town to the region beyond the Zambezi, which is about 1,950 miles, has been completed, and there are numerous branches into fertile regions. The line from Cairo to Khartum, 1,300 miles, is in successful operation, and telegraph connection extends much farther to the interior. The government of Egypt has given material encouragement to railroad and telegraph building, which is also true of Great Britain, France, Belgium, and other European countries having African colonies. The estimated cost of the Cape-to-Cairo railway is placed at $120,000,000. It is to extend north from Bulawayo along the east shore of Lake Tanganyika, passing through the Tanganyika Territory, thence it will extend through British East Africa and follow the course of the Blue Nile to Khartum. The navigation of the Nile, Niger, Congo, and other streams, and on the equatorial lakes, is an important factor in developing trade. Transportation has also been improved by the building of wharfs and the deepening of harbors.

Animal Life. Among the animals peculiar to Africa are the cape buffalo, two-horned rhinoceros, zebra, gorilla, quagga, gnu, giraffe, hyena, deer, aard-wolf, and many species of monkeys. The camel thrives throughout the desert region; the elephant is found in the central portion; crocodiles and hippopotami are met with in nearly all the great rivers, and the lion is common to all parts not inhabited by Europeans. An abundance of fish is common to the rivers and lakes, while ostriches roam in flocks upon the plains. In the warmer parts of Africa, as in all tropical regions, many varieties of insect pests prevail. The locust has been a scourge in some parts from remote antiquity, while vegetable and animal life is preyed on more or less by the scorpion, zebub fly, many species of ants, and other insects. All the domestic animals common to Europe and America have been successfully introduced in the regions partly or wholly occupied by Europeans, and there are considerable interests in raising buffaloes, elephants, and ostriches.

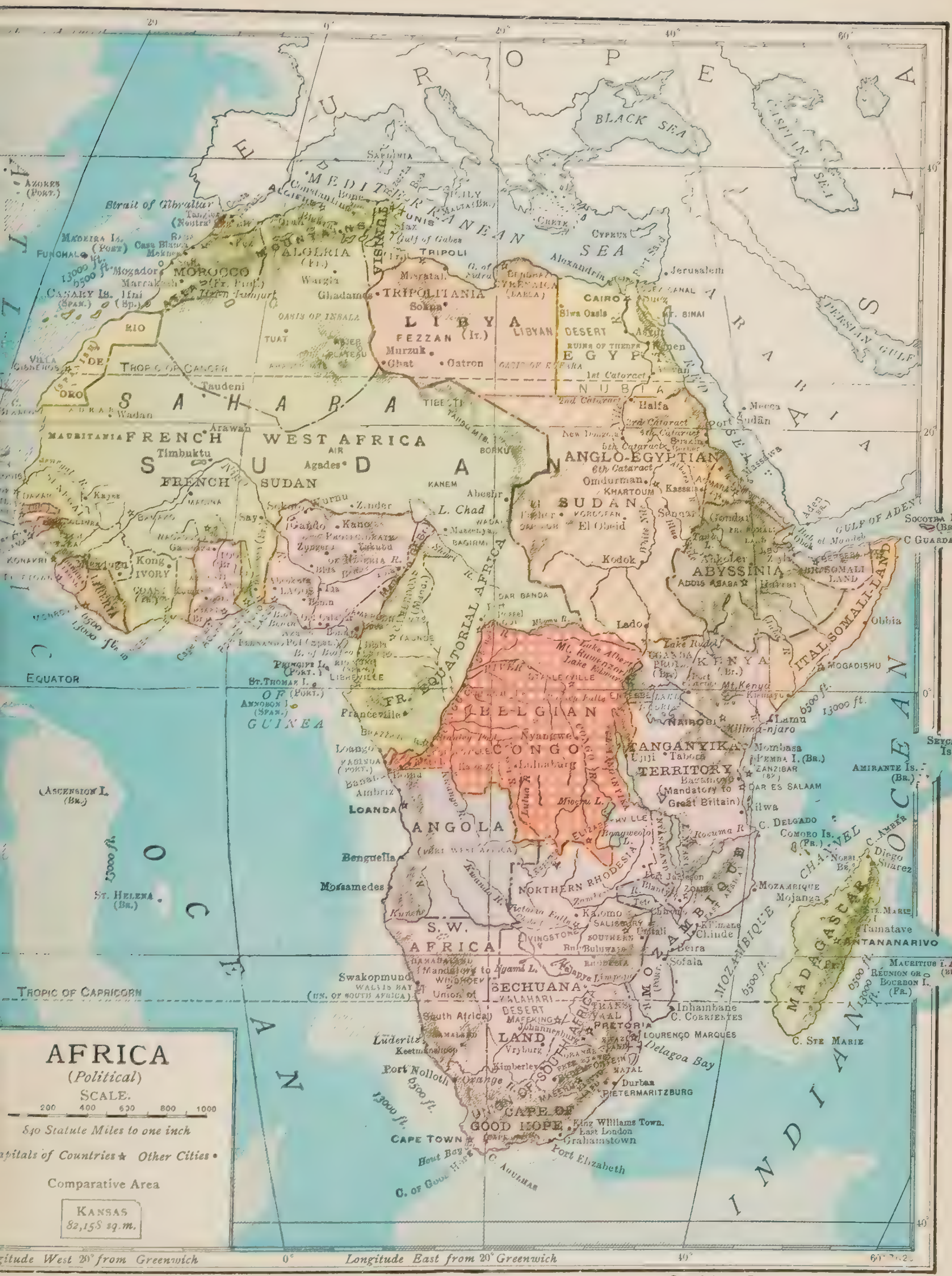
Inhabitants. In population Africa occupies third place among the grand divisions, being exceeded only by Asia and Europe. The most accurate estimates made in 1922 place the total population at 148,388,682. Most of the vast populations are still savages, and are not well known to the civilized world. The people in the northern region may be classed as Hamitic and Semitic, while in the central and southern sections the natives belong to the Hottentot and Negro races. The Bushmen, Kaffirs, Hottentots, and Hereros are the more important peoples of the southwestern sections. In the interior the different tribes are frequently at war with each other, though their primitive method of warfare is not particularly destructive. The weapons of the natives consist largely of such implements as clubs and spears, with which they have shown great valor in the hopeless battles against conquest by the Europeans. As to religion, the people of Africa are classed largely as pagans and Mohammedans, though the Christian religion is professed by descendants of Europeans and by the people of some portions of Abyssinia and Egypt, and an effective missionary work is in successful progress.



AFRICAN NATIVES

Social Conditions. The social conditions of Africa are transitory, with a tendency somewhat favorable to betterment, though polygamy and slavery are still widespread. Human life is not safe in large tracts of territory on account of the government being tribal, life is more or less savage, there is an absence of central authority, and many of the people are fettered with terrors and superstition. While European occupation is gradually tending to better social conditions by employment and education, many remote sections are densely populated by savages who wage persistent war against European progress. However, the savage and semi-civilized conditions are crumbling rapidly before the advance of European enterprise, and every department of life and industry is undergoing changes for the higher and better.

Partition. The partition of Africa has been going on for several decades and spheres of influence have been fixed to include various sections, but boundary lines between the several districts have been definitely fixed by only a number, and the remaining boundaries are yet to be established by surveys. Great Britain and France have established colonies in or claim protectorates over more than three-fourths of the entire continent. While France has the largest area, Great Britain holds the most valuable possessions, due to the fact that the British territory has greater fertility and possesses climates which are more favorable for industrial and commercial development. Germany and Turkey, though formerly holders of extensive possessions in Africa, lost their territory as a result of the World War. These holdings were taken over chiefly as protectorates and now are under the governments of Belgium, France, and Great Britain.


AFRICA
(Political)
SCALE.
200 400 600 800 1000
840 Statute Miles to one inch
apitals of Countries ★ Other Cities •
Comparative Area
KANSAS
82,158 sq. m.
E U R O P E
A S I A
BLACK SEA
CASPIAN SEA
MEDITERRANEAN SEA
SARDINIA
SICILY
MALTA (Br.)
CRETE
CYPRUS
Jerusalem
SUEZ CANAL
MT. SINAI
PERSIAN GULF
A R A B I A
Mecca
RED SEA
Aden (Br.)
GULF OF ADEN
SOCOTRA I. (Br.)
C GUARDAFUI
AZORES (PORT.)
Strait of Gibraltar
Tangier (Neutral)
MADEIRA IS. (PORT.)
FUNCHAL
CANARY IS. (SPAN.)
Casa Blanca
Mekness
Rabat
Fez
Mogador
Marrakesh
MOROCCO (Fr. Prot.)
Ifni (Sp.)
RIO
DE
ORO
VILLA CISNEROS
Algiers
Oran
Constantine
Bone
ALGERIA (Fr.)
TUNIS
Sfax
Gulf of Gabes
TUNISIA
ATLAS MOUNTAINS
Wargla
Ghadames
OASIS OF INSALA
TUAT
TRIPOLI
G. of Sidra
Misrata
Bengazi
CYRENAICA (BARKA)
TRIPOLITANIA
Sokna
L I B Y A (It.)
FEZZAN
Murzuk
Ghat
Gatron
LIBYAN DESERT
Alexandria
Port Said
CAIRO
Siwa Oasis
Assiut
E G Y P T
RUINS OF THEBES
Kenen
Assuan
1st Cataract
NUBIA
2nd Cataract
Halfa
3rd Cataract
4th Cataract
5th Cataract
6th Cataract
Berber
New Dongola
Port Sudan
Suakin
Massawa
TROPIC OF CANCER
Taudeni
S A H A R A
ADRAR
Wadan
Arawan
MAURITANIA
FRENCH WEST AFRICA
Timbuktu
AIR
Agades
TIBESTI
BORKU
S U D A N
FRENCH SUDAN
SENEGAL
Dakar
Kayes
KANEM
Abeshr
L. Chad
WADAI
Zinder
Say
Sokoto
Kano
Wurnu
Gando
Zungeru
Yakubu
Bida
Lokoja
NIGERIA
PROTECTORATE OF NIGERIA
Niger R.
BAGIRMI
Massenya
Shari R.
KONAKRI
Kong
IVORY COAST
Monrovia
LIBERIA
GOLD COAST
Abeokuta
LAGOS
Ibadan
Benin
Calabar
KAMERUN
Yaunde
FERNANDO PO (SPAN.)
B. of Biafra
PRINCIPE I. (PORT.)
ST. THOMAS I. (PORT.)
ANNOBON I. (SPAN.)
RIO MUNI (SPAN.)
LIBREVILLE
EQUATOR
G U L F OF G U I N E A
FR. EQUATORIAL AFRICA
Franceville
Brazzaville
Loango
KABINDA (PORT.)
Boma
Banana
Ambriz
LOANDA
ANGOLA
(PORT. WEST AFRICA)
Benguella
Mossamedes
Kunene
DAR BANDA
Bangasso
Ubangi R.
ANGLO-EGYPTIAN SUDAN
Omdurman
KHARTOUM
Kassala
Sennar
Fashoda
KORDOFAN
El Obeid
Kodok
Lado
Gondar
ABYSSINIA
ADDIS ABABA ★
Ankober
Harrar
Obok
Zeila
Berbera
FR. SOMALI LAND
BR. SOMALI LAND
ITAL. SOMALI LAND
Obbia
MOGADISHU
Lake Rudolf
Lake Albert
Mt. Ruwenzori
Lake Edward
UGANDA PROT. (Br.)
K E N Y A (Br.)
Mt. Kenya
Kismayu
NAIROBI
Lamu
Kilima-njaro
Mombasa
PEMBA I. (Br.)
ZANZIBAR (Br.)
DAR ES SALAAM
Kilwa
Stanleyville
Stanley Falls
BELGIAN CONGO
Nyangwe
Lulua R.
Kasai R.
Lake Mweru
Lake Tanganyika
ELIZABETHVILLE
Bangweolo L.
Ujiji
Tabora
TANGANYIKA TERRITORY
(Mandatory to Great Britain)
Bagamoyo
C. DELGADO
Rovuma R.
L. Nyasa
NYASALAND
Fort Jameson
Blantyre
Zomba
NORTHERN RHODESIA
Zambezi R.
Kalomo
Victoria Falls
Livingstone
SALISBURY
SOUTHERN RHODESIA
Bulawayo
Umtali
Chinde
Tete
MOZAMBIQUE
Mojanga
Beira
Sofala
Inhambane
C. CORRIENTES
LOURENÇO MARQUES
Delagoa Bay
S.W. AFRICA
(Mandatory to Union of South Africa)
DAMARALAND
WINDHOEK
Ngami L.
Swakopmund
WALFISH BAY (BR. OF SOUTH AFRICA)
BECHUANALAND
KALAHARI DESERT
Mafeking
TRANSVAAL
PRETORIA
Johannesburg
Vryburg
Limpopo
NAMAQUALAND
Luderitz
Keetmanshoop
Port Nolloth
Orange R.
Kimberley
ORANGE FREE STATE
BASUTOLAND
SWAZILAND
NATAL
Durban
PIETERMARITZBURG
UNION OF SOUTH AFRICA
CAPE OF GOOD HOPE
CAPE TOWN
Hout Bay
C. of Good Hope
C. AGULHAS
King Williams Town
East London
Grahamstown
Port Elizabeth
COMORO IS. (FR.)
MOZAMBIQUE CHANNEL
Nossi Be
C. AMBER
Diego Suarez
MADAGASCAR (Fr.)
Ste Marie
Tamatave
ANTANANARIVO
C. STE MARIE
MAURITIUS I. (BR.)
RÉUNION OR BOURBON I. (FR.)
SEYCHELLES IS.
AMIRANTE IS. (BR.)
INDIAN OCEAN
ATLANTIC OCEAN
ASCENSION I. (BR.)
ST. HELENA (BR.)
TROPIC OF CAPRICORN
6500 ft.
13000 ft.
15000 ft.
20°
0°
20°
40°
60°
40°
20°
0°
20°
40°
Longitude West 20° from Greenwich
Longitude East from 20° Greenwich

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p. 32)

The independent states are Egypt, Liberia, and Abyssinia, Morocco having become a possession of France by treaty with Germany in 1911.

Egypt, until 1923, was a protectorate under British control, and Great Britain and Egypt exercised concurrent jurisdiction over Eastern Sudan. The British colonies include Cape Colony, Transvaal, Rhodesia, British East Africa, British Central Africa, Natal, Gambia, Lagos, Orange River Colony, Gold Coast, Mashonaland, Matabeleland, Sierra Leone, Nigeria, British Somaliland, Uganda, Walfisch Bay, Zululand, and Zanzibar.

France possesses the largest scope of territory in Africa and also has Madagascar. Its possessions are Algeria, Morocco, Tunis, Dahomey, French Guinea, French Congo, French Sudan, Algerian Sahara, Ivory Coast, Senegal, Sahara, French Somaliland, Wadai, and Obock. In 1918 the British acquired a mandatory over German East and Southwest Africa, Kamerun, and Togoland. The colonies of Portugal are Angola, Portuguese Guinea, and Portuguese East Africa. Italy has Eritrea and Italian Somaliland. A part of Morocco and Rio d' Oro are Spanish colonies. The Belgian Congo belongs to Belgium.

HISTORY. The history of Africa dates back to remote antiquity, in fact Egypt and Abyssinia ranked as ancient in the period when Greece attained to its height of power. It is uncertain when its historical era begins, possibly as far back as 5,000 B. C. The Romans came in contact with people who occupied the section of Northern Africa extending from the Red Sea to the Atlantic. Carthage reached its zenith before the rise of the Roman Empire. Cambyses conquered Egypt in 525 B. C. and Alexander the Great made a successful conquest of that country in 321 B. C., but even subsequent to the latter conquest the Egyptians were patrons of the arts and sciences. In the time of Solomon, about 1000 B. C., the Queen of Sheba visited Palestine, and at that time Ethiopia, now Abyssinia, ranked as a country of antiquity. Central and Southern Africa were less known for the reason that the powerful nations bordering on the Mediterranean prevented the exploration of the interior. Christianity was introduced into Africa in the second century, when synods were founded at Carthage and Alexandria. The Vandals invaded the northern section in the second century, at which time Ptolemy flourished in Alexandria. The maps of Ptolemy indicate that the Nile basin was quite well known in his time, and he gave a fairly accurate account of the mountains and some rivers in the west central part of the continent. At the time of the Crusades Northern Africa was occupied by the Mohammedans and became a battle ground between the Cross and the Crescent, though the interior was not entered by Europeans at that time. In the 15th century the Normans visited the Gold Coast and in 1413 built a fort at Elmina.

Modern exploration of Africa may be said to have commenced in the year 1415, when Prince Henry of Portugal invaded Northern Africa and defeated the Moors at Ceuta. This stimulated interest in the unknown continent and caused explorations to be made both along its coast and toward the interior. Bartholomew Diaz discovered and sailed around the Cape of Good Hope in 1485, and in 1497 Vasco Da Gama doubled the Cape and sailed to India.

The more recent exploration of Africa may be said to date from 1768, when James Bruce, a Scotchman and consul for Great Britain at Algiers, began an exploration of the valley of the Nile. Mungo Park, also a Scotchman, in 1795 explored the Niger country. David Livingstone began his famous tour northward from Cape Town in 1840 and devoted more than 30 years to the exploration of the continent as far north as Lake Tanganyika. The peaks of Kenia and Kilimanjaro were discovered by the German missionaries Krapf and Rebmann in 1847, and Heinrich Barth, a German explorer, in 1850-52, explored the country from Tripoli to Timbuktu, whence he proceeded to Lake Tchad, and returned by way of Tripoli to Europe. Henry M. Stanley circumnavigated lakes Tanganyika and Victoria Nyanza in 1873, and about the same time two German expeditions under Gerhard Rohlf and Dr. Nachtigal explored the region from Morocco to the Gulf of Guinea and the principal mountains in the Sahara and Sudan. The Portuguese made extensive explorations of South Central Africa, from Saint Paul de Loanda to Mozambique. The map of Africa as it appears at the present time is a fair indication of the explorations by European countries, since the partition of the continent is based quite largely on the tours made by explorers, though there have been some changes or modifications of boundaries. The present line of activity is concerned with the development of territory held by European countries, but the issues of the Great European War, which began in 1914, had a wide influence upon these developments, especially upon commerce.

AFRICAN METHODIST CHURCH, the Negro branch of the Methodist Episcopal Church, which was organized in 1816. At present this branch includes 5,000 ministers and a membership of 550,000. The African Methodist Episcopal Zion Church was organized in 1820 and has about 460,000 members.

AFRIKANDER (ăf-rĭ-kăn′dĕr), a term of Dutch origin, meaning a white man of Dutch descent born in Africa. The term is used to distinguish from the word *Uitlander,* which signifies a foreigner.

AGAMEMNON (ăg-å-mĕm′nŏn), the king of Mycenae and Argos, son of Atreus, brother of Menelaus, and commander of the allied Grecian army at the siege of Troy. In Homer's "Iliad" he is described as a very stately and dignified character. He and his brother Menelaus married sisters, the two daughters of the king of Sparta, whose names are given as Clytemnestra and Helen. The Trojan Paris carried off Helen, thus causing the Trojan War. Agamemnon was assassinated after his return to Greece from the war with Troy by his wife, Clytemnestra, and her lover, Aegisthus. His children, Iphigenia, Electra and Orestes, were the favorite subjects of the Greek drama.

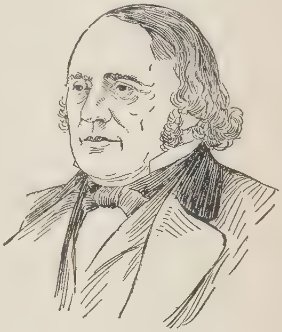
AGAÑA (ȧ-gän'yȧ), a city of the Ladrones, capital of Guam, located on the Agaña Bay. Through the city flows a shallow stream, which is crossed by several stone bridges. The streets are wide and clean. It is the seat of an arsenal, a college, and several fine schools and churches. Though the bay is obstructed by reefs, the city has considerable shipping trade. Since its acquisition by the United States, in 1898, it has been improved by modern facilities, such as telephones and electric lights. Population, 7,595.

AGANIPPE (ag-a-nĭp'pe), a fountain of Greece, near Mount Helicon, discharging into the river Permessus. From it the Muses derive their name Aganippides, and it is said that its waters give a poetic inspiration.

AGARIC (ăg'ȧ-rĭk), a fungus growth belonging to the genus *agaricus,* of which there are numerous species. True agarics have radiant gills, tinged with brown, pink, white, purple, or black. The common mushroom belongs to this class of plants and is cultivated extensively as a delicate article of food. Some species are popularly called toadstools and a few are dangerous poisons.

AGASIAS (ȧ-gā'sĭ-as), a Greek sculptor of the 4th century B. C., celebrated for the statue made by him representing a soldier contending with a horseman. It was found in the ruins of Antium, and is now in the Louvre collection, Paris. This statue is generally known as the "Borghese Gladiator."

AGASSIZ (ăg'ȧ-sē), **Alexander,** geologist and zoölogist, born in Neuchâtel, Switzerland, Dec. 17, 1835. He was the only son of Louis Agassiz, under whose guidance he became interested in the natural sciences. In 1855 he graduated at Harvard University, and two years later received a degree from the Lawrence Scientific School. From 1860 to 1865 he was assistant in the Museum of Comparative Zoölogy at Harvard University, subsequently he visited different museums in Europe, and in 1874 was made curator of the Museum of Comparative Zoölogy, an institution founded by his father. He made a number of trips to collect material for museums, especially to Lake Titicaca and the coast of Chile, and in 1875 founded a private laboratory and salt water aquarium at Newport, R. I. In 1866 he became interested in copper mining in Upper Michigan, where he aided in developing the deposits of the Calumet and Hecla mines, which became the most valuable copper mining property in the world. He gave more than a million dollars to aid the study of zoölogy at Harvard University and at other institutions, and was made a member of several noted scientific associations. His important publications include "North American Starfishes," "The Cruises of the Blake," "North American Acalephs," and "Islands and Coral Reefs of Fiji." He died March 27, 1910.


LOUIS JOHN RUDOLPH AGASSIZ.

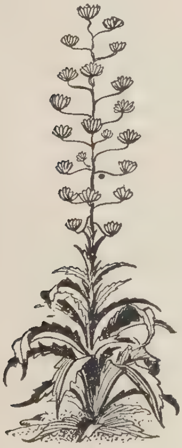
AGASSIZ, Louis John Rudolph, eminent naturalist, born in Montiers, Switzerland, May 28, 1807; died in Cambridge, Mass., Dec. 14, 1873. His first training was at home, and then at the gymnasium in Bienne, but later he studied at the universities of Zurich, Heidelberg, and Munich. He was fond of natural history, especially botany. His world-wide reputation was made by his lectures and the excellent work entitled "Studies of Glaciers." In 1846 he came to America with the two-fold design of investigating the geological and natural history of the United States and delivered a course of lectures on zoölogy at the Lowell Institute. The scientific and pecuniary advantages presented to him in this country induced him to settle here and to remain till the end of his life. At Harvard he became professor of zoölogy and geology, where he created intense interest in the study of natural sciences, and attained to wide popularity by lecturing in all parts of the country and by writing for publication in various periodicals. His explorations of Brazil and the Atlantic and Pacific shores of North America added many natural specimens, and resulted in numerous new discoveries in the field of knowledge. While in Brazil, he was shown marked courtesy by Emperor Pedro II., and in the United States by John Anderson, a citizen of New York, who gave the island of Penikese and $50,000 to him for the purpose of endowing a national school of practical sciences. Besides lecturing in Harvard College, he was professor in Cornell, and added greatly to the Cambridge Museum. His influence upon scientific knowledge in the United States was far-reaching and profound. He published "Fresh-water Fishes," "Principles of Zoölogy," and the result of his exploration of the lakes, entitled "Lake Superior."

AGASSIZ, Mount, a volcanic peak in Arizona, located 70 miles northeast of Prescott. It is one of several extinct volcanoes of the San Francisco Mountains and towers 10,000 feet above the level of the sea. A peak of the same name in Utah has an elevation of 13,000 feet.

AGATE (ăg'āt), the name applied to a stone of the quartz variety, in which the colors are in bands, in clouds, or in distinct groupings. The principal varieties are known as plasma, onyx, mocha, bloodstone, carnelian, and chalcedony. The chief constituents are forms of silica, and the colorings are due mostly to iron. When polished, agates assume a beautiful appearance, and are used in the manufacture of bracelets, seals, and brooches, and in mosaic work. They are found in various parts of the United States, and in Brazil, India, Arabia, Scotland, and particularly at Oberstein, a small town near Mentz, Germany.

AGATHOCLES (ȧ-găth'ō-klēz), tyrant of Syracuse, born in Sicily in 361 B. C.; died in 289 B. C. He became a potter under the direction of his father, but later raised himself to a high military rank and became distinguished as an orator. In 317 B. C. he obtained more power, after the massacre of a large number of prominent and wealthy citizens. Subsequently he invaded Africa, where he defeated the Carthaginians in several engagements, but was ultimately defeated and compelled to retreat. He died from the effect of a poisoned toothpick which had been given to him under the direction of Archogathus, his grandson, who had made himself powerful by means of an insurrection.

AGAVE (ȧ-gā'vȧ), a genus of plants popularly known as American aloes, native to Mexico and Central America, and now extensively naturalized in Eurasia and Northern Africa. There are various species, the best known being the so-called maguey of Mexico. Its chief uses are for feed, and ropes are made from the fiber of the leaves. The Mexicans extract its sap, which, when fermented, yields a beverage resembling cider, and is known as *pulque*.



AGAVE.

AGE, a period of time, used in a variety of senses, but usually to denote the whole or part of the duration of any particular being or thing. The term *age* is used in law to designate the period at which individuals become eligible to do what they are otherwise legally disqualified from doing for want of years or maturity of mind. In England and the United States both males and females attain legal age at twenty-one, though the latter become of age in most states of the latter country at eighteen years for some purposes, as contracting marriage, while males are eligible to election as representatives of the United States at twenty-five years and as senators at thirty years. The military age is from eighteen to forty-five. The stages of civilization are spoken of in history and mythology as five distinct ages; namely, the Golden Age, the Silver Age, the Bronze Age, the Heroic Age, and the Iron Age. The term *age* is also used in various expressions, as the Dark Ages, the Middle Ages. Geological ages include the Archaean Age, or the time which witnessed the dawn of life; the Palaeozoic Age, including the time during which animals and plants bore little resemblance to those now living; the Mesozoic Age, including the time during which the animals and plants began to resemble those now living; and the Cenozoic Age, including the time during which the animals and plants bore decided resemblance to those now living. These four ages are divided into still other periods or ages, as the Archaean into Azoic and Aeozoic Ages, the Palaeozoic into the Silurian, Devonian, and Carboniferous Ages, and the Cenozoic into the Tertiary and Quaternary Ages; the Mesozoic comprises the age of reptiles. Shakespeare divided the life of man into seven ages, and men of science usually divide it into four or eight ages.

AGEN (ä-zhän'), a city in France, capital of the department of Lot-et-Garonne, 75 miles southeast of Bordeaux. It is noted as a market for prunes and has cotton, linen, and woolen manufactories. It has railroad connection with the principal cities of France. The surrounding country is fertile. A college, a public library of 20,000 volumes, and several fine bridges across the Garonne River are among the chief improvements. The city was known by the Romans as Aginnum. It has a cathedral which dates from the time of Clovis, and is the birthplace of Bory de St. Vincent. Population, 1901, 22,482; in 1921, 24,548.

AGENT (ā'jent), in law, a person employed to act for another, called the principal, in dealing with third persons. The term is not used by Blackstone and occurs rarely in the decisions and law dictionaries before the 19th century. The term *agent* differs in meaning from the word *servant* in that the latter is applied to one who renders personal services to his employer, while an agent is authorized to act for and represent another in business transactions. An agent may be special or general, the former limiting to special business, while a general agent has power to transact all of the business in which the principal is engaged as enumerated in the contract, either verbal or written, existing between the two parties. The form of contract under which an agent may be employed varies greatly, but in special cases where the agent is authorized to sign the name of the principal the contract must be in writing and acknowledged under seal of a notary public or a similar officer, and in such cases the authority conferred is called power of attorney.

The principal is bound by the act of an agent when under contract, or in case he has ratified the act in the absence of a contract, and is liable to the third party in the same way as if he had done the act himself. If an agent makes known the name of his principal no personal liability is incurred by the agent, but if an agent does not disclose the principal for whom he is acting, and it is not known by the third party that he is acting for someone else, the agent himself becomes liable. Both the principal and agent are liable to third persons in case the agent commits a civil offense, though ultimately the liability rests upon the agent, but his principal cannot be held for a violation of the criminal code by the agent. If no contract as to remuneration exists between the two parties it is understood that the agent is to be compensated for his services, including all proper expenditures arising from the conduct of the business, but the relations and limitations are usually defined in the contract. In most countries an agent has a lien upon the property in his hands held for sale or in his possession for delivery to third parties, and it serves as security to the agent that the principal will carry out his part of the contract, and an agent is entitled to damages if the principal does not comply with the contract as specified. In like manner the agent becomes liable to the principal for failure to use reasonable diligence in carrying out the terms of the agreement.

AGESILAUS (à-jĕs-ĭ-lā'ŭs), King of Sparta, son of Archedamus II., and successor of Agis II. He reigned from the demise of the latter in 398 B. C. until his death in 360 B. C. At the head of a powerful army he invaded Asia Minor and defeated the Persians in 397 B. C. Three years later he was recalled to Greece and commanded the Spartan army against the confederate forces of Thebes, Athens, and other states of Greece that had formed a coalition. The Spartans were defeated by the Epaminondas in the Battle of Leuctra in 371 B. C., at which Agesilaus was not present, but subsequently he successfully defended the city of Sparta against a siege by the Epaminondas. Biographies of Agesilaus were written by Plutarch and Xenophon, by whom he is described as having been of small stature, lame, and simple in dress and manner of living.

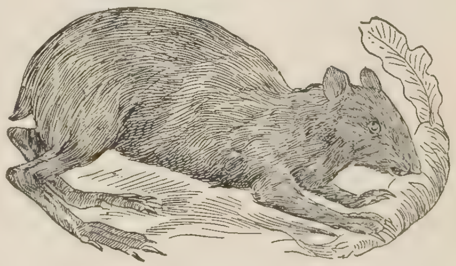
AGINCOURT (ä-zhăn-kōōr'), a village in the department of Pas de Calais, France, famous for the victory of Henry V. of England over the French on Oct. 25, 1415, after a struggle of three hours' duration. The English army numbered about 15,000 and the French 50,000; the latter were commanded by Constable D'Albert. The former lost 1,600 slain and wounded, and the latter 10,000, including many officers.

AGNEW (ăg'nū), **Daniel Hayes,** surgeon, born in Lancaster County, Pa., Nov. 24, 1818; died March 22, 1892. He studied at Jefferson and Newark colleges, graduated at the University of Pennsylvania in 1838, and established the School of Operative Surgery in Philadelphia. For a number of years he was professor in the medical department of the University of Pennsylvania. His prominence may be attributed to his successful surgical practice in connection with prominent patients, among them President Garfield. His writings embrace "Practical Anatomy," "Principles and Practice of Surgery," and Anatomy and Its Relation to Medicine and Surgery."

AGNOSTICISM (ăg-nŏs'tĭ-sĭz'm), a word coined by Professor Huxley, which implies the mental attitude in regard to the Deity of those who professedly "do not know." This school teaches that, beyond what a man can know of God by his senses or feel by higher affections, nothing can be known. One who holds to this view is called an agnostic.

AGNUS DEI (ăg'nŭs dē'i), a title applied to Christ in John i, 29, and used as the fifth and last section of the Roman Catholic mass. The mass begins with the words "Agnus Dei, qui tollis peccata mundi," meaning "Lamb of God, who taketh away the sins of the world." Agnus Dei is the name of a cloth bearing an image of a lamb and used in the Greek church to cover the cup in the communion service. Luther retained the singing of Agnus Dei in his reformation of the church service. In a modified form it is still used in the Lutheran church.

AGOUTI (à-gōō'tĭ), a small rodent mammal related to the porcupine and common to the West Indies and South America. The common agouti, about the size of a rabbit, is native to Brazil. This animal ravishes on sugar cane and vegetables, especially potatoes and yams, hence it has been killed in large numbers and the species is almost exterminated. The black agouti is common to the West Indies. There are nine species, some of which are hunted for their flesh, which is white and quite nutritious.



AGOUTI.

AGRA (ä'grà), a city of India, situated 783 miles northwest of Calcutta, and 115 miles southeast of Delhi. In ancient times the city was surrounded by walls that embraced an area of about eleven square miles, but of this space only about one-half is occupied at present.

The city is the seat of several noted mosques and the Taj Mahal, a mausoleum dating from the 17th century, built by Emperor Jehan for himself and his favorite wife. Agra is now a commercial market for cotton, salt, sugar, cereals, and various manufactured articles. There are excellent railroad conveniences, gas and electric lighting, rapid transit, several schools and hospitals, and a number of government buildings. It rose to importance in the 16th century, and from 1526 to 1658 was the capital of the Mogul sovereigns. Population, 1901, 188,310; in 1922, 188,944

AGRAM (ä′gräm), a city in Jugo-Slavia, capital of Croatia and Slavonia, 165 miles southwest of Vienna. It is located near the Save River, at the foot of the Agram Mountains, and is important as a railroad and commercial center. The manufactures embrace linen and silk goods, leather, porcelain, and clothing, and it has a large trade in wine and grain. It is the seat of an archbishop, has a Gothic cathedral dating from the 15th century, and is the seat of the Franz Josef University. The city was founded by the Romans and was partially destroyed by the Tartars in 1242. Population, 1921, 57,930.

AGRARIAN (ȧ-grā′rĭ-an), the name of a political party in Germany, whose avowed principles relate to the ownership or tenure of land. The subject of legislation in regard to land tenure dates from ancient history. Agrarian laws in the ancient Roman Republic were advocated and adopted under C. Licinius Stolo in 367 B. C., who was then tribune of the people. These laws made a division of the lands and enabled the plebeians to come into possession of titles as well as the patricians. The land to which these laws related was public property belonging to the state, and not private property, as is popularly supposed. However, they prescribed, under a penalty of heavy fines, that no one should possess more than 300 acres of the public domain.

AGRICOLA (a-grĭk′o-la), **Cneius Julius,** eminent Roman general, born at Forum Julii, July 13, 37 A. D.; died Aug. 23, 93. He received his military training in Massilia, now Marseilles, France, and was given important opportunities under Vespasian. His successes in political life were won largely on account of the conquest of Britain to the dominion of Rome, particularly because he subdued the southern portion and reconciled the Britons to Roman supremacy. He not only constructed fortifications, but made valuable discoveries by exploring the coasts and rivers. The news of his successes inflamed the jealousy of Domitian and occasioned his recall in 87. After this he lived in retirement and refused the office of pro-consulships in Asia and Africa, which lay within his choice. His life, written by Tacitus, his son-in-law, is regarded one of the finest specimens of biography in literature.

AGRICOLA, Rudolphus, eminent educator, born at Baflo, Holland, in 1443; died at Heidelberg, Germany, Oct. 28, 1485. He studied in the chief universities of Europe, attained a high scholastic distinction as a teacher in Italy, and in 1843 became Professor of Philology and Philosophy at Heidelberg. He diffused knowledge of Greek in Germany, made popular the study of classical Latin, and became well known as a student of music and theology. His writings are devoted chiefly to the improvement of the spoken language and the spread of knowledge in literature and classical languages.

AGRICULTURAL EDUCATION, the plan or system of instruction designed to disseminate knowledge of agriculture and render this department highly efficient and profitable. While instruction in the art of farming and animal husbandry dates from antiquity, the agricultural college is a product of the 19th century. Originally the plan was to provide institutions in which exclusive attention could be given to agricultural subjects, in which agriculture was designed to be the leading, if not the only branch of study, but more recently schools and colleges devoted to this subject of learning adopted a diversity of courses. Though a college may be said to belong to the class known as agricultural schools, it is now the general rule for the faculty to take up a vast diversity of subjects, though each student is required to pursue study in one or more subjects relating especially to agriculture, such as agricultural chemistry, live stock husbandry, forestry, beekeeping, farm management, rural engineering, agricultural technology, etc. Instruction in agriculture has been encouraged by all civilized countries, even where such training has not been provided for in colleges that may be termed distinctly agricultural.

Great Britain. The first college devoted to agriculture was established in England, near Cirencester, where a company headed by Prince Albert in 1845 founded the Royal Agricultural College. This institution still holds rank as one of the most important institutions of the kind in the world, and in attendance holds rank with the national school of agriculture at Berlin, Germany. The University of Cambridge founded a professorship of agriculture in 1899, and the government renders aid to education in agriculture by grants of money paid through the Department of Agriculture. Canada has a fine institution at Guelph, Ontario. A dairy school is maintained in New Brunswick, and there are secondary schools of agriculture in Quebec and Nova Scotia. Agriculture is taught as a branch in the normal and public schools in many sections of the Dominion. Australian institutions devoted to this branch of knowledge are numerous, including those at Richmond, New South Wales; at Gatton, Queensland; and at Dookie, Victoria.

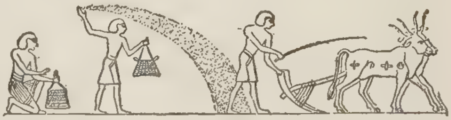
United States. The government of the

United States has expended large sums of money for the establishment of schools of agriculture and mechanic arts, in which farming is taught as a science. An agricultural college is now maintained in every State, and these are largely in connection with State universities. The general assemblies of many states have also made appropriations to encourage the organization of agricultural societies for the purpose of aiding in placing the industry upon a practical and scientific basis. A large number of periodicals devoted to the discussion of dairying, stock raising, horticulture, farm architecture, care and tillage of the soil, and other branches of the industry have come into general circulation and have had a molding influence. In 1862 Congress passed an act for the purpose of aiding in the establishment of colleges of agriculture. The act originally provided for the payment of $15,000 to each State and Territory, which sum was increased until it amounted to $30,000 per year for maintenance and $15,000 for original research work. Federal support was greatly increased by Congress in 1925.

AGRICULTURAL EXPERIMENT STATION, an institution devoted to the scientific and practical investigation for the benefit of agriculture and the dissemination of information relating to plants and animals. The purpose of governments promoting stations of this kind is to diffuse knowledge in regard to plants that are useful or injurious to certain localities, the plants and animals that thrive best under definitely known climatic conditions, and the art of cultivating plants and rearing animals. The principal stations in Canada are at the Agricultural College of Guelph, Ontario, and the Central Experimental Farm at Ottawa. The latter has branches in Manitoba, British Columbia, Nova Scotia, and in several places of the Northwest. The station at Rothamsted, England, is noted for having made valuable discoveries in the art of fertilizing and the nutrition of plants and animals. Germany and Russia each have more than one hundred stations, chiefly connected with universities. Austria has 47; Norway and Sweden, 45; Italy, 22; Belgium, 15; and Japan, 16.

The first station of this class in the United States was established in 1875 by Connecticut, at Wesleyan University, Middletown, under the direction of W. O. Atwater. About the same time E. W. Hilgard was placed in charge of a station at the University of California, Berkeley, Cal. At present there are fifty-seven stations in the United States, supported by the national government under the Purnell Act; the annual aid extended by the government amounts to about $2,880,000, and the States devote large sums to their support. About 700 persons are employed in the administration of the stations, and 500 bulletins are distributed for general information. The stations and a large number of institutions at which agriculture is studied, such as agricultural and mechanical colleges, are bringing about a deeper interest and a more practical application of methods tending to render the business of farming more lucrative and rural life more genial. Education along agricultural lines is also promoted by farmers' institutes, by university extension work, by study of courses in common and secondary schools, by departments in general college courses, and by instruction in universities.

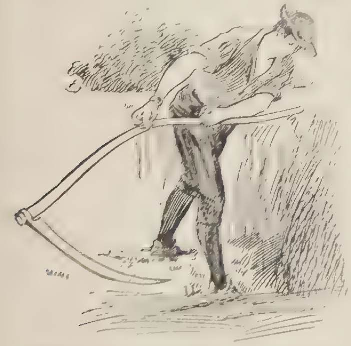
AGRICULTURE (ăg-rĭ-kŭl'tůr), the science that treats of the cultivation of the soil, with the view of disseminating knowledge in the production of grasses, vegetables, and cereal crops. The process of human and economical and social development has been from a savage state to hunting and fishing; from these to a nomadic pastoral state; then to a rude form of agriculture, and finally to manufacturing and commerce. However, all the stages, except the first, are still represented in the more advanced countries. Agriculture as an industry has existed from a remote period of antiquity, and, by practical experience from time to time, has been materially bettered by improvements in the implements employed and a diversification of the crops. It is but recent that material success in the occupation of the farmer has been thought to result from education in the arts and sciences of farming. For this reason it may be truly said that agriculture is the oldest of the arts and the most recent of the sciences.



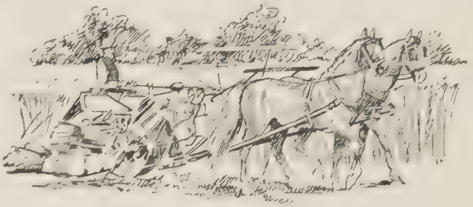
EGYPTIAN SCULPTURE—PLOWING AND SOWING.

From sacred history we learn to know Egypt as a land so rich in corn that it produced an abundance for the sustenance of its own dense population, and that it yielded large quantities for exportation to distant countries. These statements of the Bible are verified by profane history. We learn from Diodorus Siculus that Egyptian farmers were acquainted with the benefits of a rotation of crops, and that they knew how to adapt plants and their cultivation to both soil and seasons. They transported annually to Rome about 20,000,000 bushels of corn. The same author informs us that the Egyptians garnered hay for their cattle during the annual inundations, and at times confined the domestic animals to meadows and green clover. They were large producers of poultry, and, to facilitate the industry, practiced artificial hatching, not unlike incubating of modern times. Their flocks were shorn twice annually and their ewes yeaned twice a year. From Egyptian decorations we obtain a fair insight into the state of agriculture among these remarkable people. They employed a superintendent to direct laborers, kept account of productions and expenditures, and showed much system in husbandry. Corn was ground by hand-mills or in structures propelled by oxen, seed was sown by hand from a basket, and the ground was cultivated both before and after scattering the seeds.

Babylonia, Egypt, Rome, and the Israelites were the great agricultural nations of antiquity. In Egypt the Israelites were trained for an agricultural life, which fitted them to take possession of Canaan, where virtually the whole population engaged in tilling the soil. They found Canaan occupied by a dense population fortified in cities. The Canaanites possessed great wealth and subsisted on the products of their highly cultivated soil, which gave forth cereals, supported large herds of cattle, and abounded with vineyards and oliveyards. The Israelites found sufficient corn in the land to sustain them from the time they crossed the Jordan. As the laws of Moses contained an agrarian clause which provided for an equal division of the soil among adult males, provisions were made to allot from sixteen to twenty-five acres of the land to each of the 601,730 able-bodied men among the Israelites.


PRIMITIVE METHOD OF CUTTING GRAIN.

The people of Greece were given to poetry, philosophy, history, and the fine arts, and their unrivaled literature affords us little information regarding the practical details of agriculture. This circumstance is accounted for at least partly by the fact that Greece possesses a surface quite unfavorable to agriculture. However, we find that in Boeotia the lakes and morasses were drained, that mountain surfaces were covered with transported soil, and that the people possessed fine breeds of domestic animals. In ancient Rome agriculture was highly esteemed, and it was only at a later period that commerce, trades, and the arts were introduced. In recent centuries, beginning with the 18th, agriculture has been augmented scientifically, and farmers have become more skillful and enterprising. Perhaps this may be accounted for because of a gradual advance in the price of produce, which has been occasioned by the increase of population and wealth derived from manufactures and commerce. Besides, the labor of agriculture has been greatly lightened and its cost lessened by means of machines and improved implements. Railroads have brought the farm nearer to the factory; that is to say, transportation from one to the other has been cheapened and quickened. There has been a decided advantage in diversifying the products of the farm and in naturalizing plants and domestic animals to countries favorable to their production. The area of tillable surfaces has been greatly augmented by redeeming swamp lands by tile-draining and other improved methods of draining, as well as by rendering fit for cultivation large tracts in arid regions by means of irrigation. Thus, the field of agriculture has been enlarged on the one hand and the consumption of farm produce greatly extended on the other.


HARVESTER DRAWN BY HORSES

Agriculture in the United States and Canada has grown to be one of the great industries, and as a fundamental enterprise is no doubt more important than any other. The 14th census of the United States, published June 30, 1920, gives the value of all farming property at $46,-991,449,090. The following statistics published in this report give a clear idea of the growth and permanent development of agriculture in the United States:

YEAR.	NUMBER OF FARMS.	NUMBER OF ACRES IN FARMS.	AVERAGE NO. OF ACRES PER FARM.	VALUE OF FARM PROPERTY.
1850 ...	1,449,073	293,560,614	202.6	$ 3,967,343,580
1860 ...	2,044,077	407,212,538	199.2	7,980,493,063
1870 ...	2,659,985	407,735,041	153.3	11,124,958,747
1880 ...	4,008,907	536,081,835	133.7	12,180,501,538
1890 ...	4,564,641	623,218,619	136.5	16,082.267.689
1900 ...	5,737,372	838,591,774	146.2	20.439.901.164
1928 ...	6,361,502	924,798,325	138.1	49,991,449,090

It will be observed that there has been a marked increase in the number of farms the past fifty years, which is more than equaled by the increase in value of all farm property, but there is a tendency to decrease the number of acres per farm as the country becomes developed and farming of a higher order is established. It is found that in general farming large scopes of land are worked by improved farm machinery, the owner or lessee taking advantage of cultivating large tracts of land by modern methods, but as communities develop and settlements become more dense there is a tendency toward a more careful husbandry, under which lands are tiled and fertilized and the production per acre is enhanced materially. The possibility of increasing the fertility of the soil is fully borne out by experience in every section where rotation of crops and improvement in fertilization are practiced. Colored farmers cultivate tracts of land about one-third as large as those operated by white farmers, though 13.4 per cent. belong to the former class and 86.6 per cent. to the latter class. The value of farm implements and machinery, in 1920, was $1,265,149,783, of live stock $4,925,173,610, and of buildings $6,325,451,528.

AGRICULTURE, United States Department of, a branch of the government, organized by an act of Congress in 1862, and whose chief officer, the Secretary of Agriculture, is a member of the presidential Cabinet. David P. Holloway published the first report as commissioner of agriculture, and his recommendation for such a department caused it to be established, but the chief officer was not a member of the Cabinet until 1889. The free distribution of seeds was begun by the commissioner of patents in 1836, and the practice has been maintained since with the view of introducing plants useful to different sections, the kinds depending upon climate and locality. The department issues bulletins and reports from time to time, which, together with the "Year Book," are published to be distributed gratis.

The Department of Agriculture as at present organized is effective in gathering and distributing knowledge useful in the cultivation of soils, the rearing of live stock and the propagation of plants. Its divisions are numerous, making it a serviceable working force. The library contains about 175,000 volumes relating to agriculture and agricultural science. In connection with it is the division of publication relating to printing, illustrating, and distributing of publications. The division of biological survey deals with the geographical distribution of animals; the division of entomology relates to the distribution and repression of injurious insects. Experiments and information regarding road-making are directed from the office of public road inquiry, while the division of forestry has charge of research relating to forest trees. Students of agricultural physics and the investigation of soils are under the direction of the bureau of soils; research and agricultural chemistry, especially fertilizers and food-producing plants, are directed by the bureau of chemistry; and the bureau of animal industry investigates dairying and imports and exports of animals, and conducts research on diseases of animals. Forecasting weather and research in climatology and meteorology are under the direction of the weather bureau. The bureau of plant industry has charge of the publication and distribution of seeds, largely through members of Congress, the investigation of fruits adapted to various soils and climate, plant-breeding, the distributing and utilizing of forage plants, and the testing and propagation of useful plants. See **United States, Departments of.**

AGRIGENTUM (ag-ri-gĕn'tum), a city on the southern coast of Sicily, founded by a Greek colony in 582 B. C., now called Girgenti. In ancient times it was a rival of Syracuse in commercial importance and military power. The Carthaginians destroyed it in 405 B. C., and at the time of the Punic Wars it was occupied by the Romans. The Saracens had possession of it from 825 to 1086 A. D. It has ruins of ancient walls and several buildings of the Greek period, including the temple of Zeus. Though once a city of 200,000 people, its present population is only 22,500.

AGRIMONY (ăg'rĭ-mô-nў), the common name of a genus of plants belonging to the rose family, native to Great Britain and found in the southern section of the United States. The flowers are small and yellow and grow in a large cluster at the ends of the stems, and the whole plant has a bitter taste and slightly aromatic smell. The leaves are pinnate and are dried for a kind of herb tea, while the roots are used as a vermifuge.

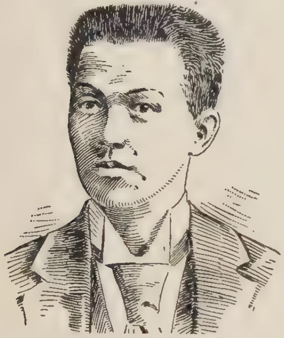
AGRIPPA (ȧ-grĭp'pȧ), sometimes called *Herod Agrippa I.*, king of Judaea and Chalcis, grandson of Herod the Great, born in 10 B. C.; died in 44 A. D. He received a liberal education at Rome, lived in elegant style, and gave extravagant entertainments. His money and gifts were bestowed so freely on the freedmen of the emperor that his debts finally rendered his presence in the city unsafe, and accordingly he took refuge in Idumea. Through the friendship of Caligula and Claudius he became ruler over large possessions, including Judaea and Chacis. While friendly to the Jews, he persecuted the Christians. By his orders James, brother of John, was beheaded, and Peter was thrown into prison. While giving a feast in honor of Claudius at Caesarea, the inhabitants of Tyre and Sidon petitioned him for peace, and he willingly received their flattery and glorification as a god.

AGRIPPA, Heinrich Cornelius, philosopher, born in Cologne, Germany, Sept. 14, 1486; died Feb. 18, 1535. He enjoyed the advantages of a course of instruction in chemistry, medicine, and philosophy, and about 1510 became secretary to Emperor Maximilian I. Subsequently he took part in military operations in Italy, was knighted for bravery in serving against the Venetians, and later became professor of physics in Pavia. Agrippa is the author of several valuable works on philosophy. He visited France at the invitation of Francis I.

AGRIPPA, Marcus Vipsanius, Roman general and statesman, born in 63 B. C., died in 12 B. C. He descended from an obscure family, but obtained a liberal education, being a classmate of Octavianus, afterward Augustus. After the death of Julius Caesar, he accompanied Octavianus to Rome, where he received an important military command, serving at different times in Italy and Gaul. In 31 B. C. he took a prominent part in the Battle of Actium, and afterwards accompanied Octavianus to Spain and Gaul. He was tribune from 18 B. C. until his death. To him Rome owes the erection of many public buildings, among them many government structures, and the restoration of aqueducts and of the Pantheon.

AGUE (ā′gu̇), an intermittent fever accompanied by paroxysms, which occur at regular intervals. It is caused by effluvia from the surface of the earth, and is confined to warm, damp climates. Ague does not prevail within the polar circles, nor in arid and elevated regions. The malady is rather more troublesome than dangerous. Quinine, calomel, and cinchona bark are preventives. Ague contracted in London caused the death of James I. and Oliver Cromwell.

AGUINALDO (ä-gwĭn-äl′dȯ), **Emilio,** Filipino leader and statesman, born in the Philippine Islands about 1868. He attained to considerable skill in educational and military arts, and by reason of personal worth and ability soon acquired considerable influence in the revolutionary war against Spain. Though at Hong Kong for some time, he returned to Manila in 1898 with the avowed purpose of aiding the United States against the common enemy in the Spanish-American War. After rendering services in and about Manila, he became estranged from the officers of the United States, and was made the leader of a formidable movement looking to the absolute independence of the Philippines. In June, 1898, he was proclaimed president, and a provisional government was organized. Hostilities between the Filipino forces and those of the United States continued with more or less effect until March 23, 1901, when Aguinaldo was taken prisoner in the Province of Isabella, in the island of Luzon, by a United States force under Gen. Frederick Funston. Subsequently he took the oath of allegiance to the United States, and has shown much interest in the development of industrial arts. Aguinaldo is not only an able speaker, but contributed several thoughtful documents on government, which were published in the *Independencia* and other journals.


EMILIO AGUINALDO.

AGULHAS (ä-gōōl′yȧs) **Cape,** the most southern point of Africa, situated about ninety-eight miles east of the Cape of Good Hope. Its highest elevation is 455 feet above sea level. In 1849 a lighthouse fifty-two feet above high water was built on its shore.

AHAB (ā′hăb), king of Israel from 918 to 879 B. C., son and successor of Omri. His wife Jezebel persuaded him to introduce the Phoenician worship of Baal. Later he became a fervid supporter of idolatry, and cruelly persecuted the priests and prophets of Jehovah. Thereupon Elijah openly attacked the priests of Baal, reproved the king, and prophesied severe punishment. Ahab was killed by an arrow in a campaign against the King of Syria, and King Jehu afterward extinguished his entire family.

AHASUERUS (ȧ-hăz-u̇-ē′rŭs), the name of two kings of Media and Persia written of in the Bible. One of these, mentioned in the Book of Esther, is probably identical with the Artaxerxes Longimanus of the Greek historians, who began to reign in 456 B. C. The other, mentioned in Ezra iv, 6, is thought to be another name for Cambyses, the successor of Cyrus to the throne of Persia, in 529 B. C.

AHAZ (ā′hăz), King of Judah, who reigned sixteen years, from 741 to 725 B. C. At the time of his reign Pekah, King of Israel, and Rezin, King of Syria, formed an alliance to conquer Judah. To repel the invaders he secured the assistance of Tiglath-Pileser, King of Assyria, who destroyed the power of Syria, but exacted heavy tribute for the service rendered. Ahaz was a weak-minded king, and his rule was rather unsuccessful. The prophet Isaiah severely denounced him for his weakness and for burdening the country with excessive taxes.

AHAZIAH (ȧ-hȧ-zī′ȧ), the fifth king of Judah, grandson of Ahab and Jezebel. During his short reign of one year he was under the control of his mother, Athaliah, and was slain by Jehu. The eighth king of Israel bore the same name. This monarch succeeded his father, Ahab, and was controlled by his mother, the ambitious Jezebel. His death was caused by a fall from the roof of his palace.

AHN (än), **Johann Franz,** eminent educator, born in Aix-la-Chapelle, Germany, Dec. 15, 1796; died Aug. 21, 1865. He ranked as an eminent teacher in several Realschulen, and held school offices in his native city and at Neuss. He is best known as author of texts for teaching languages. His French grammar for Germans has gone through over 200 editions. Ahn's method to teach a foreign language follows the natural course by which a child learns to speak, and in it *example* is made to precede the rule. Besides publishing numerous text-books in grammar, he wrote several handbooks in conversation and published "Poetry of Germany."

AID-DE-CAMP (ād′de-kän), a superior confidential attendant upon a general in active service, whose duty is to receive orders and communicate them to others. He exercises this function while battles are in progress, and at other times acts as secretary and confidential agent.

AIMARD (ȧ-mär′), **Gustave,** novelist, born in Paris, France, Sept. 13, 1818; died June 20, 1883. He removed to the United States when a boy, and during a residence of ten years in Arkansas and Mexico gathered much material regarding life among the Indians. Subsequently he traveled in Spain and Turkey, and served as an officer in the French Army during the Franco-German War. His writings include "The Adventurers," "Lynch Law," and "The Arkansas Trappers."

AINMILLER (īn'mĭl-lẽr), **Max Emanuel,** painter, born in Munich, Germany, Feb. 14, 1807; died Dec. 9, 1870. He attended the Munich Academy, where he made a special study of painting stained glass, and in 1844 was made director of the government manufactory of stained glass. His chief work was in the cathedrals of Ratisbon, Cologne, and the University Church at Cambridge, England. He painted forty windows in the cathedral at Glasgow, Scotland, in which one hundred scriptural and historical pictures are displayed. There are splendid specimens of his work in the National Gallery at Berlin and in churches in Munich and Nuremberg. Ainmiller is reputed the restorer of glass painting.

AINO (ī'nō), or **Ainu,** the name of an aboriginal people of Japan, found chiefly in Yezo, Saghalien, and the Kurile Islands. Though classed as uncivilized or barbarian, they are of a mild and amiable disposition. In stature they are short, averaging about five feet in height, but are active and strong. Hunting and fishing are their chief occupations. The complexion is dark brown or black. They are in general very hairy, the men wearing long beards. It is thought they were driven north by the advance of the Japanese, but more recently they have learned from their superiors, and many have been converted to the Protestant religion. It is estimated that the total number of Ainos does not exceed 15,000.

AINSWORTH (ānz'wûrth), **William Harrison,** novelist, born at Manchester, England, Feb. 4, 1805; died Jan. 3, 1882. At an early age he became interested in writing ballads and tales, and studied law with the view of engaging in that profession, but later decided to become a publisher. His first writings were contributed to the *London Magazine* and other periodicals, and in 1826 he began a publishing business in London, in which year he completed his first novel, "Sir John Chiverton." His second novel, "Rookwood," gave him his reputation as a writer. He was particularly strong in weaving the fashionable and vividness into his works. Among his publications are "Star Chamber," "Cardinal Pole," "Merrie England," "John Law, the Projector," and "Beau Nash." In 1842 he began publishing *Ainsworth's Magazine.*

AINTAB (īn-täb'), a city of Asiatic Turkey, in northern Syria, 60 miles north of Aleppo. It is important as a military post and is the seat of a Protestant missionary station for work among the Armenians. Being located on the route from Aleppo to Armenia, it has an important trade, especially in cotton and leather. The inhabitants are chiefly Armenians and Greek Christians. Population, 44,500.

AIR, the gaseous substance, composed of oxygen and nitrogen, which surrounds the earth. It is elastic, and is destitute of taste, color, and smell. Pure air is a mechanical mixture, containing by weight 23.10 parts of oxygen and 76.90 nitrogen, and by volume 20.90 of oxygen and 79.10 of nitrogen. To these must be added a nearly constant quantity of carbonic acid, usually about five or six parts to every 10,000 parts of air, and a very variable portion of watery vapor. Owing to a property of the gases called *diffusion,* these gaseous ingredients, though of different densities, are found in the same relative proportions at all heights. The oxygen and carbonic acid are the most important of the gases. Oxygen is necessary to the existence of animal life, since it supports combustion and respiration; carbonic acid is necessary to the existence of plant life, as it is composed of carbon and oxygen, and is the source from which vegetation derives its woody fiber. In inspiration animals take in oxygen and give out carbonic acid; in sunlight plants take in carbonic acid and give out oxygen. This serves to maintain the relative proportion of substances necessary to the existence of animal and plant life.

Air is elastic; that is, it may be compressed so a given quantity may occupy a smaller volume than it does in nature, and, when the pressure is removed, it again assumes its original volume. It expands when heated and contracts when cooled. The oxygen of air is more soluble in water than nitrogen, and the air dissolved in water contains about one-tenth more oxygen than atmospheric air. The animals whose life is sustained by breathing in water, such as fish and polyps, and plants that thrive in water, take in oxygen less diluted with nitrogen, but more with water. The air in cities is less pure than in the country districts, since it is polluted by the breathing of large populations, and there are fewer plants to supply oxygen. In illy-drained districts, where miasma arises to pollute the air and gases from sewers and other impurities tend to poison it, the public health is endangered. A large number of persons breathing without sufficient ventilation soon poison the air by consuming the supply of oxygen and replacing it with carbonic acid gas. Thus, the ventilation of public buildings becomes a subject for considerate study, since health and public comfort depend largely upon the existence of pure air in sufficient quantities. See **Atmosphere.**

AIR BRAKE, a brake operated by condensed air, and used extensively on railway and street railway cars. The first patent on the air brake was issued in 1869 to George Westinghouse, an American engineer, but since that time it has been greatly improved. The first invention was what is known as the straight air brake, and in 1873 the automatic air brake was invented, which has an auxiliary reservoir and a triple valve as well as a train pipe and brake cylinder, thereby causing resistance to the several cars of a train instead of only to the forward cars, as was the case in the straight air brake. In 1897 a high-speed brake was placed on the market, which is used on passenger trains of very high speed. It uses very high air pressure when the train is at full speed, and by an automatic reducing valve the pressure is gradually reduced as the speed of the train diminishes. There are several forms of the air brake, being designed for light and heavy cars, and for cars used on steam railway, cable, and electric railway lines. Labor organizations have been potent factors in securing the adoption of the air brake, and at this time it is very extensively used in Canada and the United States and to a less extent in other countries.

AIR CELLS, in physiology, the cells existing in the lungs, where they surround the lobular passages. They are very small, rarely exceeding one-hundredth of an inch in diameter. In birds they penetrate the quills and bones, thus facilitating flight through the air.—Air engine, a machine in which heated air is the propelling force, that is, air takes the place of steam in a steam engine. Air engines have an advantage over steam engines in that air can be raised with safety to a higher temperature than steam, and they have been found of much utility in mining and tunneling.—Air shaft, an opening from the surface of the earth to some portion of the galleries of a mine, constructed for the purpose of ventilation. Air shafts should be in two parts or at least have two longitudinal passages, the one for the ascending vitiated air, and the other for the descending pure air. Circulation can be induced by a fan, or by heat from a furnace.—Air stove, or furnace, a device used to generate hot air, which is then transmitted by means of an opening to the different apartments of a building.—Air thermometer, an instrument used in measuring the degree of heat by means of the expansion of air. Such an instrument can be utilized only to measure the lower temperatures, and agrees with the mercurial thermometer up to 260°, but above that point mercury expands more than air. It was invented by Santorio, a physician of Padua, Italy, in 1590.

AIR COMPRESSOR, a machine or air pump for compressing air by forcing it into a closed vessel. In the common bicycle pump, which is a simple form of an air compressor, there is a valve at the bottom of the cylinder opening outward, and in the piston is a valve opening downward. The cylinder is filled with air when the piston is raised, and the piston valve is closed with a downward stroke of the piston, hence the cylinder valve is forced open and the air escapes into the vessel. The air brake pump, with which nearly all locomotives are equipped, is a simple form of power air compressors. A 9½-inch air brake pump consumes one pound of steam at 140 pounds pressure and yields 1.85 cubic feet of air at 90 pounds pressure, while a 2-stage Corliss air compressor with the same steam consumption yields 13.7 cubic feet of air at 90 pounds pressure. It will be seen that in the air brake pump economy of steam consumption is not considered important, since the main consideration is to secure a machine light in weight, small in dimensions, and absolutely reliable in action.

Otto von Guericke of Magdeburg, Germany, invented the air pump in 1650. William Cubitt, in 1851, invented the first modern air compressor and used it successfully in tunnel construction and for bridge work. In his machine and most others compressed air is drawn as needed from a reservoir, the machine storing it for use as required. In mining and tunneling very powerful compressors are employed, some exerting a pressure of 3,000 pounds to the square inch, and the highest known pressure obtained in laboratory experiments is 60,000 pounds to the square inch. Among other uses air compressors are employed as rock drills, hoisting engines, polishing machines, sand blast apparatus, pumps, molding machines, air brakes on railroad and street cars, stone cutting apparatus, etc.

AIR ENGINE. See **Air; Air Cells.**

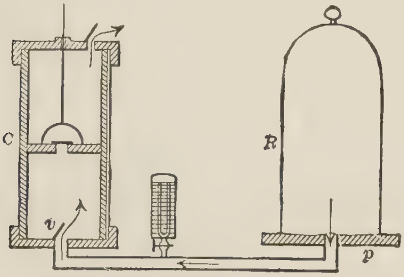
AIR GUN, an instrument for the projection of balls by the elastic force of compressed air, usually in the form of an ordinary gun. It contains a metallic globe furnished with a small hole and a valve opening into it, which contains a condensing syringe.

AIR MAIL. The air mail postal service of the United States is a substantial business enterprise. Besides the transcontinental airway between New York City and San Francisco, which is 2,669 miles long, of which the 2,045 miles between the eastern terminus and Salt Lake City are equipped with night-flying service, there are feeder lines which total 4,759 miles. In 1928 government air mail planes flew 2,583,056 miles over the transcontinental airway, of which nearly a million miles were flown at night. This route carried a total of 17,345,960 letters, according to the Aëronautical Chamber of Commerce.

AIR PLANT, or **Epiphyte,** a plant attached to another plant and which derives its nourishment chiefly from the air. Plants belonging to this class receive no parasitic nutrition from the plants to which they are attached and the attachment is wholly mechanical. Orchids and ferns have many epiphytic forms, and in the tropics many tree trunks and evergreen forests abound with lichens and other air plants.

AIRPORT, a field for the departure, return, and storage of aircraft. Airports are necessary where aviation is used commercially. They are best located in a clear field with level surface near the outskirts of a town or city. Among the necessary equipment are landing rooms, hangars, storehouses, ticket offices, electric lighting, etc.

AIR PUMP, an instrument invented by Otto von Guericke (1602-1686), a German physician, in 1650. It is used to remove air or other gases from an inclosed space, or for compressing air within an inclosed space. Many improvements have been made on the air pump, but, since an actual vacuum can never result from the action of a pump, the machines now in use can do no more than reduce air to a high state of rarefication. An air pump with a single cylinder is used to fill the pneumatic tire of a bicycle, while the machines used for general purposes contain two cylinders. The ordinary air pump contains a receiver of glass (R), which rests on a horizontal plate of strong glass (p), ground perfectly smooth. Under the receiver is an opening that has connection with the upright cylinder (C), and in the cylinder is a piston fitted sufficiently close to be air-tight. The piston is worked by a pinion, while in the cylinder is a valve (v) so constructed that when the piston is raised it communicates with the receiver, and the communication is shut off as the piston falls. As the machine is put in operation the air from the receiver fills the cylinder, and the longer the operations continue the more rarefied the air in the receiver becomes. By applying considerable force the air in the receiver can be almost wholly withdrawn. The air pump is used in preparing globes for electric lighting, in low pressure engines, for condensing milk and refining sugar, and in connection with many other processes in manufacturing.



AIR PUMP.

AIR SHIP. See **Flying Machine.**

AISNE (ān), a river of France, in the western part, flows into the Oise after a course of 170 miles. Canals connect it with the Marne and the Meuse. A great battle was fought in the valley of the Aisne in 1914, after the Germans had retreated from the Marne.

AIX-LA-CHAPELLE (āks-lă-shȧ-pĕl′), or **Aachen,** an important city of Germany in Rhenish Prussia, about forty miles west of Cologne. The city is the capital of an administrative district of the same name, and is the focus of an important network of railways connecting Germany, Holland and Belgium. It contains the magnificent coronation hall of the German emperors, whose length is 162 feet and width sixty feet, and there is a splendid fountain with the statue of Charlemagne, erected in 1620. The city enjoys a good trade with continental countries, and exports large quantities of manufactures to America. The chief articles of manufacture include shawls, silks, woolen goods, glass, pins, needles, machinery, tobacco, leather, and chemicals. Charlemange made it the second city of his empire, and the seat of government of his dominions north of the Alps. It is generally assumed that this military leader was born here, while it is certain that he died in the city, and his tomb is in the beautiful cathedral. Aix-la-Chapelle was the place of coronation of the emperors of Germany from 813 to 1531, during which time it became one of the most important free cities, although it was twice ravished by the Normans, in 851 and in 882. The removal of the coronations to Frankfort caused it to lose its leading position, and its prosperity was greatly injured by a destructive fire in 1666. At the time of the Revolution it was made a part of France, but in 1815 was ceded to Prussia. Population, 1905, 144,095; in 1920, 156,044.

AIX-LA-CHAPELLE, Congress of, the congress held in 1818 at Aix-la-Chapelle to regulate the affairs of Europe after the War of 1815. In this meeting were represented Austria, Prussia, England, Russia, and France, known as the five great powers of Europe, and the protocol agreed upon announced a policy known as the Holy Alliance. France was evacuated by the foreign forces as a result of this congress. Those in attendance included the King of Prussia, the Emperor of Austria, the Czar of Russia, Wellington, Metternich, Richelieu, and Castlereagh.

AIX-LA-CHAPELLE, Treaty of, the name given to two treaties concluded at Aix-la-Chapelle. The first, between England, Sweden, and Holland, known as the Triple Alliance, and Louis XIV., concluded May 2, 1668, settled the question of the posssession of the Spanish Netherlands. After the death of Philip IV., Louis XIV. seized several forts and claim to that portion of the Netherlands which had been under the dominion of Philip. Holland, as a means of protection, concluded the Triple Alliance and France was forced to surrender possession except to the fortresses of Lille and Charlerois, while Spain retained Franche Comté. The second, regarding the War of the Austrian Succession, was concluded in 1748. The treaty gave Maria Theresa possession of the throne of Austria. All the great powers of Europe had been involved in the war, but the treaty permitted the several states to retain possession of their territory nearly the same as before, though Silesia and Glatz were given to Prussia and Spain received Parma, Guastalla, and Piacenza.

AJACCIO (å-yät'chô), the capital of Corsica. It is important as a seaport and has a safe and commodious harbor. The surrounding country is fertile. Anchovy and pearl fisheries furnish the chief employment. The city has a good trade in wine and olive oil. It is the birthplace of Napoleon, and has a cathedral dating from 1585. Population, 20,197.

AJAX (ā'jăks), the name of two Grecian chiefs of the Trojan War, one the son of Oileus, and the other of Telamon. The latter is represented by Homer, next to Achilles, the boldest of the Greeks. It is said that Hercules was present at his birth and made him invulnerable, except in the armpits, by wrapping the child in his lion's skin. He sailed from Salamis with twelve ships to the seat of war, where in a fit of bravery he defied the lightnings. Ajax claimed the armor at the death of Achilles, but it was given to Ulysses, which so grieved him that he committed suicide. His sad death is made the basis of the tragedy of Sophocles, entitled "Ajax."

AKABAH (ä'kȧ-bä), **Gulf of,** an inlet at the north end of the Red Sea, extending into Arabia Petraea. It is from 12 to 17 miles wide and extends about 100 miles to the northeast. Golden Port, 29 miles east of Mount Sinai, is the only good harbor.

AKBAR (ăk'ber), the most eminent of the Mogul emperors of Hindustan, born in October, 1542; died in September, 1605. It is generally assumed that he was born in Amerkote, in Sind. He succeeded his father, Humayun, in 1556, under the regency of a Turkish nobleman named Bahram Khan, but by proclamation in 1560 took the reins of government in his own hands. He was a friend to education, established schools, encouraged commerce, and surveyed the lands in order to institute a just system of taxation. Though many different races were represented in his dominion, he treated all with equal tolerance. He was so successful in the administration of law that he became known as the "Guardian of Mankind," and was emulated by the Indian princes of subsequent periods. His death occurred at Arga, and his body was deposited in a magnificent mausoleum.

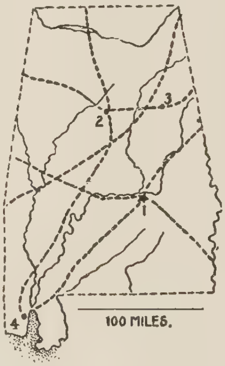
AKENSIDE (ā'ken-sīd), **Mark,** poet and physician, born in Newcastle-upon-Tyne, England, Nov. 9, 1721; died June 23, 1770. His father was a butcher in the place of his birth and wished him to engage in the ministry of the Presbyterian Church, and with that object in view he studied at Newcastle and at the University of Edinburgh. While at the latter institution he decided to become a physician, and after taking two years of work in medicine he studied at Leyden, where he graduated in 1744, and practiced his profession in Northampton. He was not very successful as a physician and turned his attention to literature and published "Pleasures of Imagination," a volume of poetry that made his reputation. He also published professional essays and pamphlets and a number of minor poems in blank verse. He has a place among the pioneers in writing romantic poetry.

AKHMIM (åk-mēm'). See **Achmim.**

AKRON (ăk'ron), a city of Ohio, county seat of Summit County, thirty-six miles south of Cleveland. It is situated on the highest elevation between the Ohio River and Lake Erie, about 500 feet above the latter, and has communication by the Pennsylvania, the Erie, the Baltimore and Ohio, and other railways. Among the public utilities are electric lights and street railways, waterworks, pavements, several libraries, and a fine system of public schools. The city is noted as a manufacturing center, employing about 65,000 persons, and the annual product aggregating about $540,500,000. Among the chief manufactures are machinery, ironware, pottery, boilers, sewer pipes, books and stationery, rubber goods, chemicals, and farming implements. It is the seat of a municipal university, formerly the Buchtel College. In its vicinity are numerous lakes and hotels, hence it is popular as a summer resort. Population, 1900, 42,728; in 1920, 208,435.

ALABAMA (ăl-ȧ-bä'mȧ), a southern State of the United States, bounded on the north by Tennessee, east by Georgia, south by Florida and the Gulf of Mexico, and west by Mississippi. Its greatest length from north to south is 334 miles, width, 154 miles, and area, 52,250 square miles, which is the exact area of North Carolina. It is popularly called the Cotton State.

Description. Ranges of the Allegheny Mountains stretch into the northern portion from Georgia and Tennessee, but do not attain to great elevations. These highlands include the Raccoon Mountains, sometimes called the Sand Mountains, which extend well across the northern part of the State, and the Lookout Mountains, which terminate about sixty miles south of the border. The mountains are generally flat-topped and have an altitude of not more than 1,600 feet, while the coastal plain has a general elevation of 600 feet. The Cumberland Plateau is a low range of hills in the southwestern part. Much of the drainage is toward the south into the Gulf of Mexico, but the northern slope belongs to the Ohio River basin.



ALABAMA.

1, Montgomery; 2, Birmingham; 3, Anniston; 4, Mobile. Chief railways are shown by dotted lines.

The Tallapoosa and Coosa rivers unite about ten miles above the city of Montgomery to form the Alabama, the chief river of the State, which is joined by the Tombigbee about forty-five miles above Mobile. From the junction to Mobile Bay the combined rivers are known as the Mobile River. The Chattahoochee forms part of the eastern boundary, and the Tennessee flows through the northern part of the State. Other rivers include the Choctawhatchee and Black Warrior. The latter is a tributary of the Tombigbee, and is navigable to Tuscaloosa, while the Tombigbee is navigable to Columbus, and the Mobile to Wetumpka.

The climate is pleasant and varies with the altitude and latitude. Breezes from the Gulf tend to render the southern portion both healthful and enjoyable, but some of the river valleys and lower portions of the state are unhealthful, and show a tendency to malaria and fevers. The State is well watered with good springs and water veins, and in many portions are artesian wells. In the winter the thermometer seldom falls below 32°, while the summers are generally pleasant. The prevailing winds are from the south and southwest. Snow falls rarely in the south, but in the northern part it falls quite frequently in January and February.

Natural Resources. The northern and northeastern section are rich in mineral deposits, including coal, clay, iron, aluminum, and quarry products, particularly sandstone and limestone. Salt is obtained in the southwestern part, and the State has more or less profitable deposits of asbestos, asphalt, marble, and copper. The mining of coal and iron has been developed extensively, and Alabama in the production of iron ore ranks next to Minnesota and Michigan. The greatest development in iron ore mining has been made in the Birmingham region. In the output of bituminous coal the State takes seventh rank. Extensive forests abound, yielding excellent material for building and manufacturing. The forest trees embrace oak, hickory, pine, cedar, elm, and chestnut, and in the southern part are fine forests of cypress, magnolia, and yellow pine.

Agriculture. Farming is the chief industry. The soil, except in the region of mountains, is fertile and well adapted to fruit raising and the culture of many varieties of cereal plants. The annual production of cotton is about 1,300,000 bales, cotton being the most important crop. Tobacco is grown profitably. Other products embrace corn, rice, sugar cane, cowpeas, potatoes, oats, wheat, and hay. Stock raising as an industry has not grown extensively the past ten years, owing to the fact that cotton is the predominant crop, though there has been a marked growth in rearing horses and swine. Interest in the rearing of sheep, cattle, and mules has not been extended materially, though the state has large interests in these classes of animals. More than one-third of the cattle are milch cows. The title in land is chiefly in large landowners, and most of the farming is done in small tracts by Negroes.

Manufactures. Manufacturing is an important enterprise, owing largely to the fact that the State has much available timber and productive iron and coal mines. The construction of cars and machinery takes rank as a leading manufacturing enterprise, though it is exceeded in the value of the output by the manufacture of timber products, cotton goods, and iron and steel. Phosphates obtained from Florida are used in making fertilizers from cotton-seed meal. Other manufactures embrace boots and shoes, turpentine, flour, wagons, automobile parts, and farming implements. The output of coke has increased rapidly the past five years, owing to the large production of coking coal. Few states have enjoyed an equal growth in the total manufactures produced annually.

Transportation and Commerce. Although the State has only one good harbor on the Gulf, at Mobile, it has extensive transportation facilities by the Alabama, Tombigbee, Mobile, and Tennessee rivers. Iron products are transported in large quantities to Mobile as a result of improving the water course of the Black Warrior River. In 1926 the State had 5,562 miles of railroads in operation, which provide transportation facilities in nearly all parts of the state, though some counties are still without steam railways. A considerable mileage of electric lines is operated, chiefly in the cities and more densely populated regions. Mobile has the larger part of foreign trade, but large quantities of products are transported through the ports of New Orleans, La., and Pensacola, Fla. Cotton, lumber, coal, pig iron, machinery, live stock, and fertilizers are the principal exports.

Government. The present constitution was adopted in 1901. It vests the executive authority in the governor, lieutenant governor, attorney general, secretary of State, auditor, treasurer, commissioner of agriculture and industries, and superintendent of education, each elected for terms of four years. Legislative authority is vested in the General Assembly, which consists of a Senate and a House of Representatives, the former being limited to a maximum of not more than thirty-five and the latter to not more than 105 members. While members of the General Assembly may be reëlected from time to time, none of the executive State officers is eligible for reëlection. Judicial authority is vested in a system of courts, consisting of the supreme court, circuit courts, chancery and probate courts, and justices of the peace. Local government is administered by the counties, municipalities, and townships. In order to be eligible to vote, the citizen must have resided within the State two years, in the county one year, and in the precinct three months, and must be able to read and write in the English language.

EDUCATION. Educationally, Alabama is making rapid strides of advancement, both in its system of common schools and its numerous institutions of higher learning. It has six normal schools for whites, located at Daphne, Florence, Jacksonville, Livingston and Troy, and a normal school for negroes at Montgomery. Tuscaloosa is the seat of the University of Alabama; Mobile, of the State Medical College; Auburn, of the Agricultural and Mechanical College; and Greensboro, of the Southern University. Tuskegee is the seat of the Industrial Institute (colored), formerly under the administration of Booker T. Washington. There is an insane asylum at Tuscaloosa, a blind asylum at Mobile, and an institution for the deaf, dumb, and blind at Talladega. The State has made ample provision for other classes demanding State care. It has many excellent public and private libraries, and numerous private commercial and denominational institutions of learning. All the leading religious denominations are well represented by growing societies, though the Baptist denomination is the most numerously represented. The educational forces as a whole are represented in about fifty high schools, seventy private secondary schools, nine colleges and universities, and many scientific and educational associations.

INHABITANTS. A large proportion of the population is rural, and only about ten per cent. of the people reside in cities of 4,000 population and over. Montgomery, on the Alabama River, is the capital, and ranks as one of the largest cities in the State. Mobile is the only seaport and is important for its large export trade in lumber, coal, and cotton. Birmingham is noted for the extensive manufacture of iron and steel products. Other cities include Anniston, Bessemer, Florence, Huntsville, Opelika, Selma, Talladega, and Tuscaloosa. In 1900 the State had a population of 1,828,697. This included a Negro population of 827,307. Population, 1910, 2,138,093; 1920, 2,347,295.

HISTORY. The history of Alabama begins with 1541, when De Soto made his famous exploring expedition to the Mississippi. In 1702 the first permanent settlement was established by the French on the Mobile River, and in 1712 the city of Mobile was founded. The region occupied by the State was originally a part of the Territory of Georgia, though the southern portion was the subject of dispute with Spain. Georgia ceded all its western lands to the Federal government in 1802, and what is now Alabama became a part of the Territory of Mississippi. Alabama was organized as a Territory in 1817, and so named from an Indian word meaning "Here we rest." It was admitted as a State in December, 1819, and since then has enjoyed rapid growth and development. In 1861 it seceded from the Union, but the act of secession was revoked in 1865, and a new constitution was adopted in 1868. The constitution adopted in 1901 requires a higher standard for voting, hence the right of suffrage is restricted largely to the white citizens.

ALABAMA, an important river of the State of Alabama, formed by the junction of the Tallapoosa and Coosa rivers, about ten miles above the city of Montgomery. It then flows about 300 miles toward the southeast until uniting with the Tombigbee forty-five miles above Mobile, where it assumes the name of Mobile. These rivers drain the northern part of the states of Mississippi, Georgia, and Alabama, and flow into Mobile Bay, an inlet from the Gulf of Mexico.

ALABAMA, The, a British vessel built at Barkenhead, England, by Laird & Sons, and used as a privateer to promote the interest of the Confederate States. She was provided with stores, coal, and guns at Terceira, one of the Azores, and on Aug. 24, 1862, was placed under command of Raphael Semmes, a native of Maryland, and manned chiefly by British subjects. Though she had no acknowledged flag or recognized nationality, she roamed the seas plundering and destroying vessels belonging to the Federal States and Union merchantmen. For more than two years she sailed upon the seas, captured 65 vessels, and destroyed property valued at $4,000,000. Her policy was to avoid contact with American armed vessels, but in the summer of 1864 she finally encountered the Kearsarge off Cherbourg, France. On June 19 an encounter took place outside the harbor of Cherbourg, about seven miles from the Cherbourg breakwater, and after a fight of an hour the Alabama was sunk. Three men on board the Kearsarge were wounded, while the Alabama had nine men killed and twenty-one wounded. Captain Semmes was taken on board by an English yacht, the Deerhound, and escaped.

ALABAMA, University of, an institution of higher learning organized at Tuscaloosa, Ala., in 1831. At the time of the Civil War it was in a prosperous condition, but was burned by a force of Federals. It was rebuilt in 1868. It is coeducational, has 140 professors and instructors, and is attended by about 4,334 students. The endowment fund is $1,620,000, which is about equal to the value of the buildings. It receives general State support. The medical department is located at Mobile. A library of 51,000 volumes and a good working laboratory are maintained.

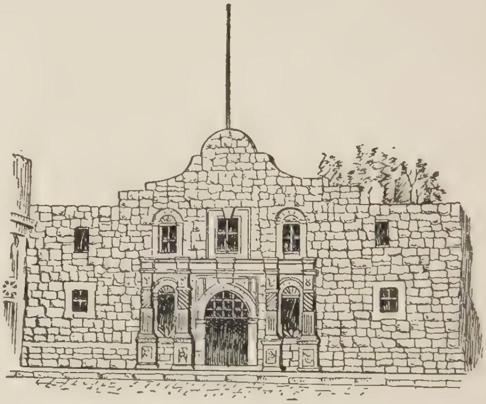
ALABAMA CLAIMS, the name applied to the claims of the United States government against Great Britain, which were settled after extended negotiations at Geneva, Switzerland, and are sometimes termed the Geneva Award. These claims were made on account of damage done by certain vessels, particularly the Alabama, which were equipped and manned from British ports at the time of the Civil War. A decision was reached by the commissioners on Sept. 14, 1871, to the effect that Great Britain was liable for equipping the Alabama and the Florida, two vessels that wrought serious devastation to the property of the United States and to property of certain citizens. The purport of the decision was that the general principles governing such cases are as follows: "Due diligence should be exercised by neutral governments in exact proportion to the risks to which either one of the belligerents may be exposed by failure to fulfill the obligations of neutrality on their part. The government of Great Britain cannot justify itself for its failure in due diligence on the plea of the insufficiency of legal means of action which it possessed." In making the decision the commission did not allow any claims by the United States for national losses, and the award was entirely restricted to compensate the American citizens for damages sustained by them. The award amounted to the sum of $15,500,000 in gold. Sir Alexander Cockburn, one of the British representatives on the commission, was the only commissioner to cast a dissenting vote.

ALABASTER (ăl-ȧ-băs′tẽr), the name applied to a very fine variety of gypsum, or hydrated sulphate of lime. The harder variety is used in the manufacture of statuettes, clock frames, and other ornamental commodities, while the softer serves in the manufacture of an inferior cement, known in the markets as plaster of Paris. Deposits of white granular gypsum are found in various portions of the United States, which occurs in pure and sound blocks, and from which the merchantable article is manufactured. However, the largest quarries are in Tuscany, Italy, where a fine grade is obtained. There are also deposits in Egypt and various regions of Asia.

ALADDIN (ȧ-lăd′ĭn), the hero of a tale of the "Arabian Nights' Entertainments." He is represented as the possessor of a remarkable ring and lamp, which, on being rubbed, would cause two genii to appear, whose office it was to do the bidding of the possessor of the ring and lamp.

ALAMEDA (ä-lä-mä′dạ), a city of California, in Alameda county, about eight miles east of San Francisco, on the Southern Pacific railroad. It has extensive electric railway and steamboat facilities, and enjoys a considerable commercial trade. The chief industries embrace shipbuilding, refining of petroleum, and manufactures of machinery, earthenware, clothing, and utensils. Gas and electric lights, pavements, and sanitary sewerage are among the improvements. The city has excellent public schools and a number of substantial church buildings. It was incorporated in 1854. Population, 1900, 16,464; in 1920, 28,806.

ALAMO (ä′lä-mo), a building in San Antonio, Texas, and frequently mentioned as the "Thermopylae of America." It is noted on account of the heroic bravery with which about 150 Texans resisted an attack of 2,500 Mexicans under Gen. Santa Anna from Feb. 11 to March 5, 1836. In the engagement 1,600 Mexicans and all but six of the Texans were killed. However, the latter were cruelly butchered after they had surrendered to the Mexicans. "Remember the Alamo" became a popular war cry in the struggle for the independence of Texas. Originally the Alamo was a Catholic mission.


THE ALAMO.

ALAND (ō′lȧn), an archipelago of about 300 islands at the entrance of the Gulf of Bothnia and forming a possession of Russia. About eighty of these islands are inhabited, the balance being rocky and uninhabitable. Formerly they belonged to Sweden, and near them a decisive victory was won by Peter the Great over the Swedes in 1717. They were ceded to Russia in 1809. The population, consisting mostly of fishermen of Swedish descent, aggregates about 19,150. The islands have a total area of 468 square miles.

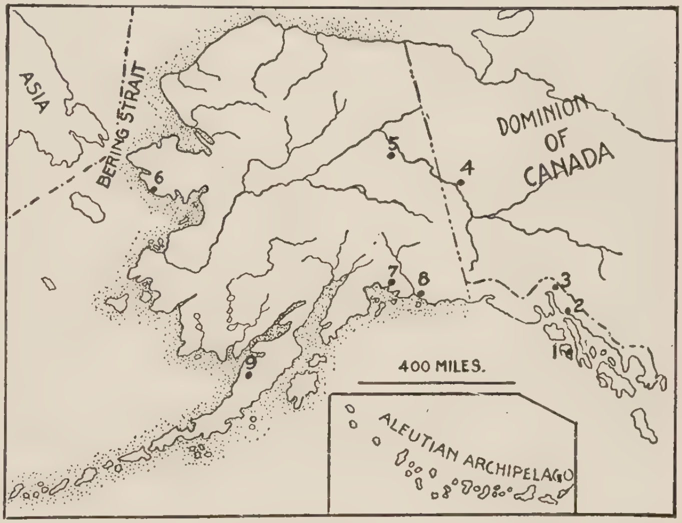
ALARCÓN Y MENDOZA (ä-lär-kōn′ē̇ mē̇n-dō′thȧ), **Don Juan Ruiz de,** dramatic poet, born at Tosco, Mexico, about the close of the sixteenth century; died in 1639. He descended from a noble family, was carefully trained for a literary career, and in 1622 took up his residence at Madrid, where he was afterward appointed reporter of the royal council of the Indies. In 1628 he published a volume of eight comedies, and 12 others were published in 1635. He is regarded one of the most distinguished Spanish dramatists. His comedy entitled "Truth Suspected" is the basis of Corneille's "Liar."

ALARIC I. (ăl′ạ-rĭk), the name of a chief of the Visigoths, and subsequently their king. He first appeared in history in 394 A. D., and seems to have been of noble birth. His birth is generally assigned to the year 376, and his death is thought to have occurred in 410. Previous to his reign the Goths north of the Danube claimed the protection of the Roman emperors against the Huns, and at that time he was leader of the Gothic auxiliaries under Theodosius in the war against Eugenius. After the death of the latter, he invaded Thessaly, Illyria, Thrace, and Macedon, devastating the country and even threatening Constantinople. Greece was sacrificed to rescue the capital from his ravages, and Athens purchased its safety by paying heavy tributes. A Roman army under Stilicho was sent against him and drove him to take shelter in Elis, in the Peloponnesus, where he was besieged, but after some time effected the escape of his army. In the year 400 he invaded Italy, but was defeated by Stilicho at Pollentia. Later he invaded Italy a second time, and on three different occasions laid siege to Rome. The first time Rome paid ransom for its deliverance; the second time the city surrendered and the Roman Attalus was substituted as emperor for Honorius, but, owing to the incapacity of the former, he was deposed and Honorius restored. The third siege of Rome by Alaric, on Aug. 24, 410, resulted in sacking the city for six days. While attempting to invade Sicily and Africa, he was taken sick and died in Cosenza. His death was celebrated in Rome and Italy with public festivals, and the countries against which he had warred enjoyed a momentary repose. Though cruel, he was less barbarous than his followers. He admired the monuments and public buildings of Rome and sought to preserve them from destruction.

ALARIC II., eighth king of the Goths in Spain, succeeded his father Euric in 484; died in 507. His dominion included the greater part of Spain, and Gaul as far as the Rhone and Loire rivers. Though peaceful and tolerant, he became involved in war with Clovis, the Frankish monarch. Alaric was defeated near Poitiers, and while fleeing was overtaken and slain.

ALASKA (ȧ-lăs′ka), a Territory of the United States, forming the northwest portion of North America, and comprising an area of 590,884 square miles. It is about twelve times as large as New York, and comprises a scope of country greater than the combined areas of France, Germany, Bulgaria, and the British Isles. The northern boundary is formed by the Arctic Ocean, eastern by the Dominion of Canada, southern by the Pacific Ocean, and western by the Bering Sea and Strait. About one-third lies within the Arctic Circle. From north to south it has a width of 800 miles, and from southeast to northwest the distance across the mainland is 1,150 miles.

Physical Features. The territory is very mountainous, though it includes much level and gently undulating surface. Chains of the Rocky Mountains and the Alaskan Mountains, a coast range, embrace the chief elevated sections. Mount McKinley, 20,464 feet in altitude, 100 miles north of Cook's Inlet, is the highest peak in North America. Its climate is extremely cold, but suitable for habitation, and large portions are covered by snow, while the earth in the northern part is frozen the entire year. The Yukon River, which has been explored by steamer for 1,400 miles, is the most important water course, and has an estimated length of 2,000 miles. Besides the Yukon, the principal rivers include the Copper, Kuskokwim, Colville, and Tanana, the last mentioned being an important tributary of the Yukon. The coast line of Alaska is placed at 7,875 miles, and is more or less indented by extensive inlets, particularly on the southern and western shores. Among the chief inlets are Kotzebue, Norton, Bristol, Cook, and Yakutat sounds or bays. Numerous glaciers discharge into the Pacific and Bering Sea, among them Muir Glacier, which is estimated the largest in the world. The discharges into the sea average a thickness of about 500 feet, and the river of ice has a length of 150 miles and a breadth varying from one to ten miles.



ALASKA.

1, Sitka; 2, Juneau; 3, Skagway; 4, Dawson; 5, Circle City; 6, Nome; 7, Sunrise City; 8, Chilka; 9, Igagik.

Mineral Resources. Lignite coal deposits occur on the Yukon, near Cape Lisbourne, at the head of Prince William Sound, and on the Aleutian Islands. The quality is not of a high grade, but it is used to a considerable extent for domestic purposes and for steam-making. Copper in paying quantities is found on Prince of Wales Island and in the Copper River country, and there are deposits of petroleum, silver ore, sulphur, and building stones. Gold is the chief source of wealth in Alaska, and is secured chiefly in the Yukon district, where valuable deposits were discovered in 1897. The following year large companies of people from the United States and other countries visited Alaska in the interest of the mining industry. The richest gold-producing region is situated at Dawson in the Klondike region, just east of the eastern line of Alaska, in British America, but rich discoveries have since been made farther west and at Cape Nome. While Cape Nome may be reached by water navigation, it has been quite difficult to make trips to the Klondike region. Expeditions to the latter region are usually made by way of Sitka and Skagway, and thence through the mountain region toward the north, but it is possible to pass up the Yukon. The yield of gold in Alaska is placed at from $7,000,000 to $18,000,000 annually, the output varying greatly with climatic conditions.

TRANSPORTATION. The transportation facilities of Alaska depend largely upon navigation, and numerous excellent harbors are accessible the entire year as far north as Juneau and Sitka. River traffic on the Yukon is closed a greater part of the year, which is the case with many of the coast inlets, as they become filled with pack-ice in the winter, such as Cook's Inlet. Public stages and dog sledges are used in carrying passengers and the mails in some sections. A railway line extends from Skagway to Whitehorse Rapids, and several other railway routes have been built, and work is being done to extend them inland. The Alaskan Central railway, when completed, will furnish transportation from Skagway to Nome, the line running through the Copper River valley to Tanana, thence to its terminus on the sea. An improved highway passes from Port Valdez to the Copper River. A telegraph cable extends from Saint Michaels to Nome, and telegraph lines are in operation between Saint Michaels, Nulato, and Eagle City.

FISHERIES. Edible fish abound in the rivers and coast waters. However, salmon fishing is the most important, and in value the output closely approaches the production of gold. The chief salmon fisheries are off the shore of Kodiak Island, Kuskokwim Bay, and near the mouth of the Yukon River. An abundance of herring, cod, smelt, whitefish, and halibut are known to exist, though the fisheries have not been developed to their full productive ability. Formerly the fur-seal was abundant on most islands in Bering Sea and on both coasts of Bering Strait, but these fisheries are now restricted to the Pribilof or Seal Islands. Whaling continues to attract attention, especially the white whale and the great Arctic whale, and considerable fossil elephant ivory is collected by the Eskimos.

AGRICULTURE. In the coast district the soil is especially fertile, but the possibility of development in agriculture is limited by climatic conditions. Rye and barley can be grown quite successfully south of a line drawn from Eagle City to Saint Michaels, and there has been considerable development some distance south in the cultivation of oats and wheat. Vegetables, such as potatoes, turnips, rutabagas, beets, and carrots, thrive in the Yukon Valley and as far north as Dawson. Grasses of a highly nutritious quality grow luxuriantly, and stock is reared with considerable success, especially cattle, which are grown both for milk and meat. Foxes are bred for their furs, dogs and reindeer are reared and used for transportation, and in some sections ponies and horses are grown. The fur trade is important, and those engaged in it during the winter give attention in the short summer to the production of vegetables and other crops necessary as provision.

EDUCATION AND GOVERNMENT. Alaska was made a civil district by an act of Congress in 1900, but remained unorganized until 1912, when it was organized as a Territory. The Governor is appointed by the President with approval of Congress. The legislature consists of two branches, the Senate with eight members chosen for four years and the House of Representatives with sixteen members chosen for two years. Women have the right of suffrage the same as men. Prohibition was adopted throughout the Territory in 1916. Alaska is subdivided into four judicial districts with courts at Fairbanks, Juneau, Nome and Valdez. One delegate, who is not permitted to vote, represents Alaska in the House of Representatives at Washington. Schools are supported, partly by federal aid and partly by local concessions, in the larger communities. Several mission schools are promoted under the direction of Protestant and Roman and Greek Catholic supervision. The first college in Alaska was established at Skagway in 1899.

INHABITANTS. Three races of native inhabitants are found in Alaska. The Alutes occupy the Aleutian Islands, the Eskimos are chiefly in the country north of the Yukon, and the Athabascan Indians are the principal inhabitants of the valley of the Yukon and the region as far south and west as Cook's Inlet. A race nearly extinct, the Thlinkeets, formerly occupied the section lying between Yakutat Bay and Puget Sound. Sitka, on Baranof Island, is the oldest town and was the capital of the Territory until 1906, when the seat of government was removed to Juneau, a thriving city of 3,038 people at the entrance of Taku Inlet. Eagle City, on the Yukon, and Skagway, the seaport of the White Pass Railway, are commercial centers. Nome, on Norton Sound, had a population of 12,486 in 1900, and its estimated population in 1925 was 852. Other towns include Circle City, Sunrise City, Chilka, and Igagik. In 1920 the Territory had a population of 64,506, as compared with 63,592 in 1900. With the former were included 1,209 Chinese and 25,331 Indians.

History. Vitus Bering, a Danish navigator, in 1740, while in the Russian service, explored the peninsula and islands of Alaska. Captain Cook in 1778 visited the coast of Alaska, and explorations were made about the same time by the Spaniards and a company of Russians. In 1784 the first settlement was made on Kodiak Island and named Three Saints. The Russian-American Fur Company was chartered in 1799 to promote the furring trade but after futile efforts to establish a profitable business its members became dissatisfied and gave up the project. The Western Union Telegraph Company explored certain sections in 1864-67 with the view of connecting America with Europe by telegraph at Bering Strait, though the successful laying of the Atlantic Cable caused the project to be abandoned. The United States purchased Alaska of Russia in 1867 at a monetary consideration of $7,200,000, and in the same year took formal possession. It was organized as the territory of Alaska in 1912.

Two international controversies, one relating to the control of the sea fisheries and the other to the boundary between Canada and Alaska, were made the subjects of negotiation between Great Britain and United States. In regard to the former the United States claimed that Russia and the United States had exclusive control of Bering Sea, but when this was referred to a commission it was decided that the claim was not well founded, but the commission recommended the restriction of the killing of seals in order to save the industry. The controversy as to the boundary was settled in October, 1903, when a commission of three representatives of the United States and three of Great Britain decided that the boundary should follow the coast and be fixed ten marine leagues inland from the coast of the mainland. The decision divided the gold fields about equally between the two countries, but the United States secured exclusive control of the Pacific Coast.

ALATAU (ä-lȧ-tou'), a range of lofty mountains in Asia, forming the boundary between Mongolia and Turkestan. The Alatau mountain range is located at the northern limit of the vast tableland of Central Asia. The formations are largely granitic and the elevations approximate 15,000 feet.

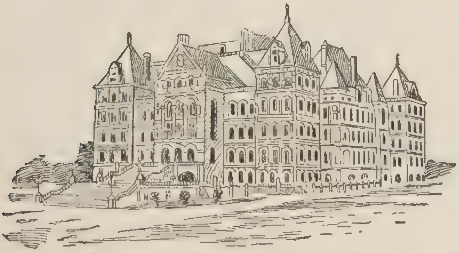
ALBA LONGA (ăl'bȧ lŏn̠'gȧ), a city of Latium, in Italy, situated near Lake Alban, about 16 miles southeast of Rome. According to tradition, it was founded by Ascanius, son of Aeneas. Tullus Hostilius, third king of Rome, destroyed it, and its inhabitants removed to Rome. At the time of its prosperity is was the most powerful city of Latium.

ALBANI (al-bā'ne), the stage name of Marie Louisa Cecilia Emma Lajeunesse, dramatic soprano, born near Montreal, Canada, Nov. 1, 1851. She developed a sweet voice at an early age, and appeared at Albany, N. Y., in 1863. Subsequently she studied in Paris and Milan, and won applause at Messina, Sicily, in 1870. She sung in opera in Paris, London, Berlin, and many cities of the United States. Albani, the name by which she is best known, was adopted because she first sang at Albany.

ALBANIA (ăl-bã'nê̇-ȧ), an independent government of Europe, located in the southwestern part of the Balkan peninsula, lying along the coast of the Adriatic and Ionian seas and the Strait of Otranto. It is about 300 miles long, and has a width ranging from fifty to eighty-five miles. The area is about 17,500 square miles. Though this region was under Turkish dominion since the 15th century, in 1913 it acquired an independent government. The surface is largely mountainous, embracing ancient Epirus, Illyris Graeca, and parts of Dalmatia. Most of the inhabitants consist of Albanian mountaineers, but there are also a considerable number of Turks and Greeks. Agriculture, fruit-growing, stock raising, manufacturing, and commerce are the chief industries, though there are also productive fisheries and some mining. The Albanians fought against Turkey in the revolt under Ali Pasha in 1807, the insurrection of 1908, and the war of 1913. The people are chiefly Mohammedans but include many Greek and Roman Catholics. Tirana (population 12,000) is the capital. Albania joined the League of Nations in 1920. It was proclaimed a kingdom in 1928. Population, 1928, 986,820.

ALBANY (a̤l'bȧ-ny̆), a city of New York, county seat of Albany county, and capital of the State. It is finely situated on the Hudson River, 145 miles north of New York City, and is the focus of a large number of railroads, including the New York Central, the West Shore, and the Delaware and Hudson lines. It has additional transportation facilities by steamboats on the Hudson River, by numerous electric interurban lines, and by the Erie Canal, the latter connecting the city with Lake Erie. Near the river is a narrow plain, but the ground rises gradually toward the west, hence the location is both convenient and healthful. State Street runs westward from the river, forming a fine thoroughfare, and the principal streets running parallel to the river are North and South Pearl and Broadway streets. The city has 150 miles of street more or less improved, and about 90 miles are paved substantially with stone, asphalt, and macadam. Washington Park, in the western part of the city, is the largest public resort. It contains a fine lake and Calverley's bronze statue of Robert Burns. Rural Cemetery, about four miles north of the city, is the burial place of President Arthur.

The architecture of Albany is substantial, and the buildings are constructed chiefly of brick and stone. The capitol building, constructed of granite in the Renaissance style, is one of the finest and most costly structures of its kind in America. It is 390 feet long by 290 feet wide, situated on an elevated plat of ground in the heart of the city, and was erected at a cost of $23,500,000. Other notable buildings include the city hall, the customhouse, the Cathedral, the Delaware & Hudson Ry. offices, the Albany Academy, the Union Station, the First Dutch Reformed Church, the post office, the Masonic Temple, and the State armory. Albany has a well-organized system of public schools and many charitable and educational institutions. The Military Museum is located on the second floor of the State capitol and contains many relics of the Civil and Revolutionary wars. It is the seat of a State normal school, of Dudley Observatory, and of the law and medical departments of Union University at Schenectady. The State library of 435,000 volumes is located in the State Education Building, and several school institutional libraries are maintained within the city.


STATE CAPITOL, ALBANY.

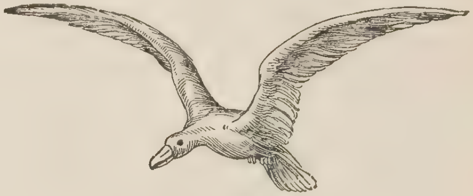
Albany is important as a manufacturing center and has a large trade in cereals, merchandise, and live stock. The leading manufactures include ironware, clothing, tobacco and cigars, boots and shoes, machinery, hosiery mills, books and stationery, and farming implements. It maintains adequate police and fire departments, has extensive systems of waterworks and gas and electric lighting, and has modern means of conducting its sewage and storm drainage. As a wholesaling and jobbing center it takes high rank, having a large trade with points in the New England states and Canada.

The city is the second oldest permanent settlement founded within the thirteen colonies. Verrazano, the French navigator, visited the region as early as 1524, and a trading post was planted soon after on the present site of Albany by the French. In 1614 it was known as Fort Nassau, but the name was changed to Fort Orange in 1624, when the first real settlement of colonists was made. When New Netherlands was transferred to the English, in 1664, the name was changed to Albany in honor of the Duke of York and Albany, who afterward became James II. The Albany Convention was held here in 1754, at which plans for uniting the colonies were discussed, and it became the seat of the State government in 1797. Its rapid growth began in 1825, when the Erie Canal was opened, and its larger commercial and manufacturing period began with the construction of railroads. Population, 1905, 98,370; in 1910, 100,253; 1925, 117,820.

ALBANY, a city of Oregon, county seat of Linn County, 80 miles southwest of Portland. It is located on the Willamette River, which supplies good water power, and has transportation facilities by the Southern Pacific and other railroads. The river is crossed by a fine steel bridge. It has manufactures of furniture and farm machinery, flouring mills, brickyards, and a public high school. Electric lights and waterworks are among the public utilities. The first settlement on the town site was made in 1850, and it was incorporated in 1864. Population, 1900, 3,149; in 1920, 4,840.

ALBANY, or **Albion,** an ancient name for Scotland and sometimes applied to the whole of Britain, but later used to designate only the Scottish highlands. It is thought to be of Celtic origin. In 1398 a Scottish council at Scone conferred the title of Duke of Albany upon the brother of King Robert III. Subsequently the title was conferred upon a number of princes of the British royal family, though it soon became extinct. In 1881 it was restored and conferred upon Prince Leopold (1853-84), the youngest son of Queen Victoria.

ALBATROSS (ăl′bȧ-trŏs), an aquatic bird allied to the petrels and gulls. It is the largest of the web-footed birds, weighing about twenty pounds, and its wings measuring from tip to tip twelve to seventeen feet. The beak is large and unusually straight and strong, and the upper mandible is characterized by sutures and a hooked point. These birds are frequently seen a great distance from land. They are most numerous in the South Seas, particularly near the Cape of Good Hope, but frequent the Arctic region as far as the extreme northern part of Bering Strait. A single albatross is often seen in the act of following ships several days in succession, though, more commonly, several fly within sight of each other, and appear to glide through the air rather than fly like other birds. When food is abundant, they gorge themselves like the vultures and then sit motionless on the water. The eggs are about four inches long, and are favored as articles of food. Natives of the Kurile Islands and Kamchatka

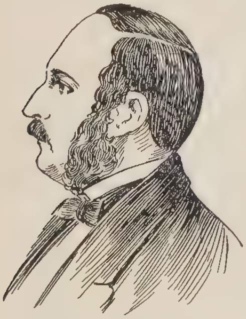

ALBATROSS.

blow up the entrails to make floats for their fish nets, and their wing bones are used for tobacco pipes and various domestic purposes. Sailors regard the albatross with superstitious affection, a fact made use of in Coleridge's "Rime of the Ancient Mariner."

ALBAY (ȧl-bī′), the name of a bay, volcano, city, and province in the southwestern part of Luzon, an island of the Philippines. The bay is a fine landing place, and the surrounding mountains make it an important strategic point. Albay, the mountain, is an active volcano. The city of Albay is regularly platted, carries a considerable trade, and has a population of 14,360. The province has a population of 296,850.

ALBEMARLE SOUND (ăl′be-märl), an inlet from the Atlantic Ocean, extending into the eastern part of North Carolina. Its length is sixty miles, the breadth is from four to fifteen miles, and it has a number of small coastal indentations. The Roanoke and the Chowan rivers flow into it, and it is connected by an artificial channel with Chesapeake Bay. An island separates it from the ocean.

ALBERT (ăl′bẽrt), **Francis Charles Augustus Emmanuel**, Prince Consort of Great Britain, Prince of Saxe-Coburg-Gotha, born at Coburg, Germany, Aug. 26, 1819; died in Windsor Castle, England, Dec. 14, 1861. He received a liberal education, graduating from the University of Bonn, and in 1838 visited England, where he was introduced by King Leopold of Belgium to Queen Victoria. The latter announced to the Privy Council in 1839 that she intended to marry Prince Albert, who was naturalized by act of Parliament in 1840, and on Feb. 10 of that year the marriage was celebrated. The prince was soon after made field marshal in the British army, knight of the garter, and chancellor of the University of Cambridge. He refused the chief command of the English army, which had been proposed to him by Wellington, and in 1857 the title of Prince Consort was conferred upon him. It was generally believed that his sympathies were in favor of the Union at the beginning of the Civil War in the United States, and he was a trusted and prudent adviser of the queen. Victoria mourned his death with almost unexampled feelings.

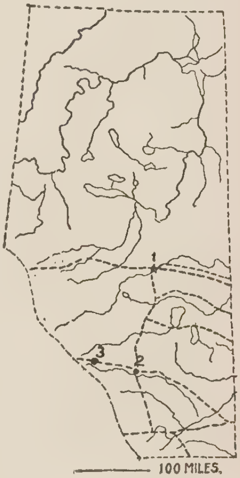


PRINCE ALBERT.

ALBERT, Frederick Augustus, king of Saxony, born in Dresden, Germany, April 23, 1828; died June 19, 1902. He was educated under the direction of a Protestant tutor, took part in the War of 1848-49, and fought with the Austrians in the Battle of Sadowa in 1866. In 1870 he distinguished himself in the battles at Gravelotte and Sedan, for which he was promoted to the rank of commander-in-chief of the fourth army, at the head of which he entered Paris after the siege of the French capital. He ascended the throne of Saxony in 1873 and governed with much ability.

ALBERT I. See **Belgium.**

ALBERTA (ăl-bẽrt′ȧ), a province of the Dominion of Canada, bounded on the north by Mackenzie, east by Saskatchewan, south by the United States, and west by British Columbia. Its length from north to south is 750 miles, the southern boundary is 175 miles, and the northern boundary, which reaches the parallel of 60°, is 220 miles in length. Its area is 254,559 square miles, being somewhat larger than Saskatchewan. The water surface is about 20,000 square miles.



ALBERTA.
1, Edmonton; 2, Calgary; 3, Banff.
Chief railways are shown by dotted lines.

Surface. The surface is mainly a great plain, with open prairie in the southern portion, extensive forests in the northern section, and elevated ranges of the Rocky Mountains in the western part. The drainage of the southern part is toward the southeast, and the streams of the northern portion flow into Great Slave Lake, from which the water flows through the Mackenzie River into the Arctic Ocean. In elevation above sea level the surface varies considerably, Fort Smith, on the northern border, being the lowest elevation, 680 feet above the sea, while the prairie steppe at the eastern side of the province is nearly 3,000 feet, and the highest peaks of the Rocky Mountains approximate 14,000 feet. The highest range of the Rocky Mountains in this section trends northwest and southeast, forming the southwestern boundary between Alberta and British Columbia. In the northern part are the Buffalo Head Hills, the Clear Hills, and the Cariboo Mountains, whose summits rise from 600 to 1,000 feet higher than the surrounding plain.

Rivers and Lakes. Alberta has four distinct drainage basins, one in the northern and three in the southern section. The Mackenzie basin is in the northern part and occupies two-thirds of the province. The most important streams of this system are the Peace and Athabaska Rivers, which merge and form the Slave River near the western end of Lake Athabaska, though the last mentioned is really the Mackenzie, being known as the Slave River between

Lake Athabaska and Great Slave Lake and as the Mackenzie from Great Slave Lake to the ocean. Both the Peace and Athabaska rivers are navigable, the former from the mountains to the lake, except below Fort Vermilion, where navigation is obstructed by Vermilion Falls. The Athabaska River rises in the mountains within Alberta, and is important as a highway for the trade carried between points in Alberta and the posts along the Slave and Mackenzie rivers. In the southeastern part the drainage is by the South Saskatchewan River and its tributaries. The North Saskatchewan River joins the South Saskatchewan near Prince Albert, Saskatchewan, forming the Saskatchewan River. Besides the Saskatchewan basin, the southern part of Alberta has sections lying in the basins of the Churchill and Missouri rivers. Lake Athabaska, partly in Alberta and partly in Saskatchewan, is the largest and most important body of water. Other lakes of considerable extent are Hay Lake, Lake Claire, Lesser Slave Lake, Whitefish Lake, Lac la Biche, Beaver Lake, Cold Lake, and Sullivan Lake.

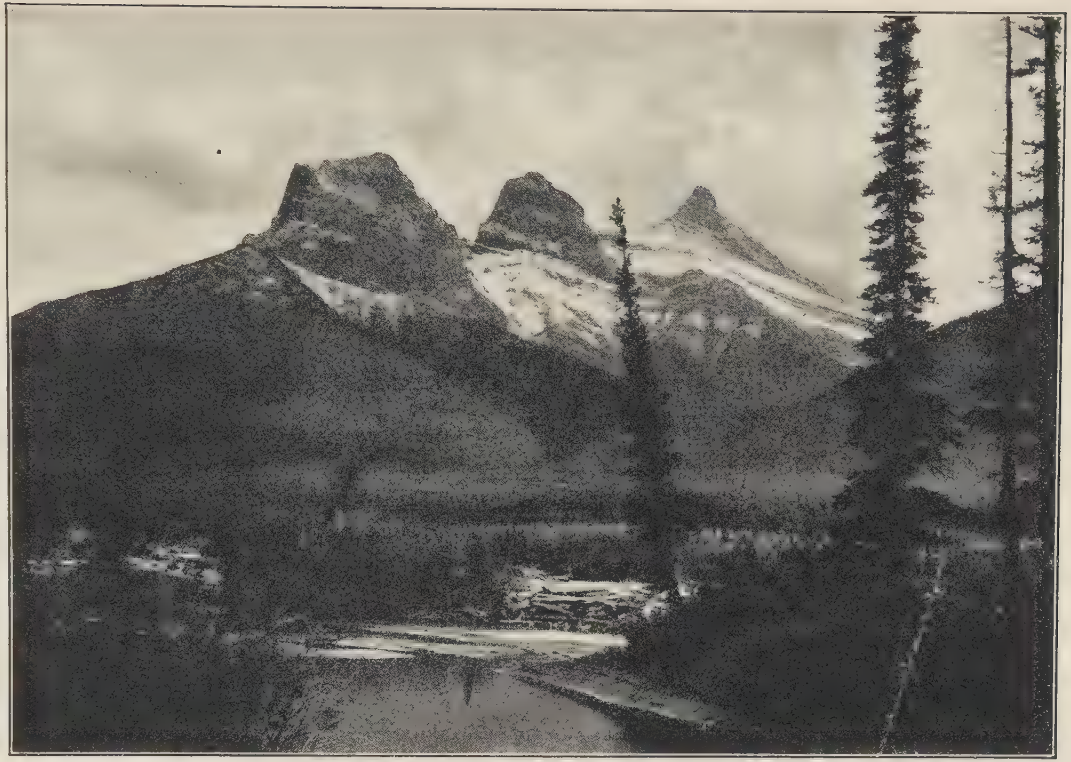
CLIMATE. The winters are dry and cold and the summers are warm. The average temperature at Fort Chipewyan, on Lake Athabaska, in July, is about 61°, and a temperature of 90° has been recorded at that place. Though extremely cold in the winter, a dry atmosphere makes the severity less oppressive, and at frequent intervals the warm Chinook winds sweep across the country from the mountains and influence the temperature favorably. In the northern part rainfall is abundant for the germination and growth of all crops adapted to the country, but in the southern part it is more or less deficient and agriculture is extended by means of irrigation, water being drawn from numerous mountain streams and rivers.

INDUSTRIES. Agriculture, stock raising, mining, lumbering, and commerce are the chief industries. Wheat is a staple product, especially in the section lying east of Calgary and between the Bow River and the Red Deer River, where irrigation canals designed to supply water to irrigate fully three million acres have been constructed. The beet sugar industry has received marked attention, especially in the vicinity of Raymond, near the international border. Stock raising is one of the chief business enterprises, large areas being devoted to ranching and dairying. Progress in lumbering has been slow on account of a lack of transportation facilities, but the improvement of several rivers as highways and extensive building of railroads are causing a great impetus in developing immense wealth from timber resources. Coal deposits are extensive below the perallel of 56°, the veins in the southern section being bituminous, but in the mountains occur anthracite deposits of considerable extent. Salt and petroleum exist in the valley of the Athabaska River, and gold is worked east of Edmonton, on the Saskatchewan River. Oats, barley, flax, vegetables, and small fruits are profitable crops and considerable attention is given to the rearing of sheep, swine, horses, and poultry. Wild animals, such as antelope, geese, grouse, and partridges, are common. Deer and moose are met with in the northern section. The streams and lakes abound with edible fish.

GOVERNMENT. The Lieutenant-Governor, who is appointed for a term of five years by the Governor-General of the Dominion, is the nominal head of the government. However, the governing power rests with the cabinet, whose members are selected from the party in the majority in the legislature. The legislature consists of sixty members elected from ridings, and the cabinet consists of eight members. Support is given to public education through land grants and by taxation, and ample provision has been made for the training of teachers and improvement of facilities to promote collegiate and higher instruction. The towns and counties have charge of local administration, and common pleas and higher courts have jurisdiction of judicial affairs.

EDUCATION. Education is held in high esteem throughout the Province of Alberta; the educational facilities are remarkably well developed. The organization of elementary public schools follows close upon the advance of settlement, and such schools are maintained by a revenue derived from a moderate self-imposed tax and supplemented by very liberal legislative grants. The programme of studies for these schools is so formulated as to give the pupils whose education ends therein an equipment for life as practical and complete as possible. Secondary schools, where students may prepare for the professions or obtain a liberal general education, exist as an outgrowth of the elementary school system and are similarly maintained. The higher courses of these schools permit of specializing to a moderate degree. The regulations provide for uniformity in the system of inspection of schools and licensing of teachers. A number of private colleges of considerable importance have been established in the larger centers. Two provincial normal schools for the training of teachers are located at Calgary and Camrose. The buildings are substantial and are equipped in every department with modern appliances. The University of Alberta, situated in Edmonton, received its first classes in the autumn of 1908. The courses include those leading to the degrees of M. D., B. A., and B. Sc.

INHABITANTS. The inhabitants are largely Canadians who have come from the provinces farther east in the Dominion, but since 1905 there has been considerable immigration from European countries and the United States. Encouragement was given by the government



THE THREE SISTERS, CANMORE, ALBERTA

Near the small mining settlement of Canmore are three great peaks conspicuously separate from other mountain groups of the region Their broken and castellated heights, seamed by titanic convulsions of nature, bear great fields of snow whose elevation make them perpetual. The traveler who crosses the mountain crest by way of Bow River Gap, the eastern gateway of the Rockies, cannot but be impressed by the weird beauty of these three silent sentinels of the mountain pass.

(Opp. 54)

through the enactment of homestead laws in the Dominion, and by extensive building of railroads. The trunk line of the Canadian Pacific passes through the southern section, with branches from Dunmore Junction and Macleod to Calgary and Edmonton, while lines of the Canadian National pass east and west through Edmonton. Other lines have been projected and are in course of construction. Edmonton, on the north bank of the Saskatchewan, is the provincial capital, and Calgary, at the confluence of the Bow and Elbow Rivers, is noted as a commercial center. In 1921 the former had a population of 58,821 and the latter 63,305, but since then both have grown materially in population and commerce. Lethridge, in the southern part of Alberta, had 11,096, and Medicine Hat, on the South Saskatchewan River, is an important business center. The census of 1911 credited Alberta with a population of 374,295. Population, 1921, 588,454.

History. The territory now included in Alberta was long a part of the portion of the Dominion known as the Northwest Territories. In 1882 the district of Alberta was established for administrative purposes. Then autonomy in local affairs was not granted and the area was 106,400 square miles. The province of Alberta was organized in 1905, when the boundaries were extended by annexing to it parts of the districts of Athabaska, Saskatchewan, and Assiniboia. George Hedley Vicars Bulyea was appointed the first lieutenant governor, who, assisted by efficient deputy heads and executive councilors, rendered efficient services as administrator of public affairs.

ALBERT EDWARD NYANZA (-nĭ-ăn′zȧ), an important lake of Africa, about fifty miles southwest of Lake Albert Nyanza, with which it is connected by the Semliki River. It was first discovered by Baker in 1862, and was visited by Stanley in 1876, who also visited the region while on his famous expedition to relieve Emin Pasha. Lake Albert Edward Nyanza is somewhat smaller than Lake Albert Nyanza, and its elevation above sea level is somewhat greater. Stanley named it in honor of the Prince of Wales, now Edward VII. In its vicinity are excellent forests, and it abounds in fish, crocodiles, hippopotami, and many aquatic birds.

ALBERT LEA (lē), a city of Minnesota, county seat of Freeborn county, 108 miles south of Minneapolis. It is located on a small lake of the same name, and on the Minneapolis and Saint Louis, the Chicago, Milwaukee and Saint Paul, and other railroads. The surrounding country is a fertile farming and dairying region. It has manufactures of flour, machinery, lumber products, and earthenware. The city has several fine county buildings, excellent schools, and good municipal improvements. It is the seat of Albert Lea College, a Presbyterian institution for women. Population, 1905, 5,657; in 1920, 8,056.

ALBERT MEMORIAL, a monument erected in Hyde Park, London, to the memory of Prince Albert, husband of Queen Victoria. It was built from plans of George Gilbert Scott, who was knighted for his skill in designing the memorial. Four marble sculptures representing engineering, commerce, manufacture, and agriculture are at the four corners of the base, and in the center is a splendid statue of the prince. A Gothic spire, surmounted by a cross, crowns the canopy above the hall in the interior, which is elegantly ornamented with mosaics and has a height of 175 feet.

ALBERT NYANZA (nĭ-ăn′zȧ), a lake in East Central Africa, one of the headwaters of the Nile. It is 22 miles wide and 100 miles long. Sir Samuel Baker first explored the lake in 1864, and estimated its surface 2,720 feet above sea level. It receives the White Nile from Victoria Nyanza, and its overflow is carried toward the north into the Mediterranean Sea. It is noted for its excellent fisheries. Extensive forests abound in the surrounding country, and its vicinity is infested with crocodiles and hippopotami.

ALBIA, county seat of Monroe County, Iowa, 66 miles southeast of Des Moines, on the Chicago, Burlington and Quincy, the Wabash, and other railroads. It has coal industries, brick plants, and fine city and county buildings. It was settled in 1845. Population, 1925, 5,166.

ALBIGENSES (ăl-bĭ-jĕn′sēz), a religious sect organized in the 12th century, and which was formerly well represented in France. This sect seems to have originated from the Paulicians, a branch of the Greek Catholic Church, which sprang into existence in the 6th century. In 1209 a severe war broke out between them and their allies on one side and the Catholics on the other. After many thousands had perished on both sides, a peace was concluded in 1229. By the end of the 13th century this sect had totally disappeared.

ALBINO (ăl-bī′nō), the name applied to a person whose skin and hair are perfectly white, a remarkable peculiarity of the physical constitution of some individuals. While albinism occurs in all parts of the world and in all races, it is most marked in Indians and Negroes. The skin has a pale, unhealthy white color, and the iris of the eye is pink or red. While the vision of albinos is better in the dark than that of others, they are unable to bear a strong light. The peculiarity of albinism is always born with the individual. It is not confined to the human race, but has been observed in rabbits, rats, mice, fishes, and birds, especially in those whose color is commonly black.

ALBION (ăl′bĭ-ŭn), a city of Michigan, in Calhoun County, 20 miles west of Jackson. It has municipal waterworks and a public library, and is important as a railroad center, being on the Michigan Central, the New York Central, and other railways. Albion College is located here. Flouring mills, plowworks, and machine shops are its chief manufactories. The first settlement at Albion was made in 1830, and its charter dates from 1896. Population, 1904, 4,943; in 1910, 5,833; in 1920, 8,354.

ALBION, a town in New York, county seat of Orleans County, 30 miles west of Rochester. It has transportation facilities by the Erie Canal and the New York Central and Hudson River Railroad. Farming and quarrying are leading industries in the vicinity. It has several public institutions, including the Western House of Refuge for Women and a modern county courthouse. Population, 1900, 4,477; in 1920, 4,863.

ALBONI (äl-bō'nê), **Marietta,** contralto singer, born at Cesena, Italy, March 10, 1823; died June 23, 1894. She studied under Rossini, and at 15 made her début at Bologna. In 1846-47 she sang in the chief cities of Europe, and at London was considered a rival of Jenny Lind. She toured the United States and Canada in 1852, singing successfully in concert and opera. While she lacked strength to perform dramatic parts, she was charming and graceful in comedy and her voice had unusual fullness and sweetness.

ALBUMEN (ăl-bū'mĕn), an organic compound found both in animals and plants. It abounds in the blood and chyle, and more or less in all the serous fluids of the animal body. It is the principal ingredient in the white of eggs. Albumen occurs in the sap of vegetables, in their seeds, and in other parts of vegetable growth. Among the chief constituents are nitrogen, oxygen, carbon, hydrogen, and small proportions of phosphorus and sulphur. It is soluble in water, in which state it is found in the juices of flesh, serum of the blood, juices of vegetables, and in the egg, but when heated to a temperature of 140° to 160° it coagulates and becomes insoluble in water. When put in tannic acid, ether, creosote, and alcohol, it also coagulates. Since it contains more nutritious matter and is more easily digested than any other food, it constitutes one of the most important of food materials. The meat of young animals is more tender than that of older ones, because in it are found larger quantities of this substance. Some forms of albumen are used to clear liquids, such as coffee and sorghum, because when boiled it collects impurities and rises as scum to the surface or sinks to the bottom, this depending upon the weight of the liquid containing it. With the knowledge of the amount of albumen contained in the different kinds of food, and the effect of heat upon it when mixed with other substances, the skillful cook can turn the art of cookery into channels both pleasing and healthful.

ALBUQUERQUE (ä-bōō-kâr'kȧ), a city of New Mexico, county seat of Bernalillo county, 72 miles southwest of Santa Fé, on the Atchison, Topeka and Santa Fé Railway. It is finely situated on the Rio Grande, about 5000 ft. above sea level, has a considerable local and jobbing trade, and contains a number of fine school and church buildings. Among its chief buildings is the University of New Mexico, founded in 1892, at which time an annual territorial appropriation of $14,000 was granted. The university is non-sectarian and is open alike for the education of both sexes. The surrounding country is farming and stock raising. Electric lights, telephones, and waterworks are among the municipal improvements. The first settlement in its vicinity was made by Spaniards in 1706. Population, 1900, 6,238; in 1920, 15,157.

ALBURNUM (ăl-bûr'nŭm), or sapwood, the part of the wood of exogenous trees which is of most recent growth and near to the bark. In color it is pale or white. It gradually hardens with age, when it is converted into duramen, or heartwood, which is harder and more valuable than alburnum.

ALCAEUS (ăl-sē'ŭs), eminent lyric poet, born at Mitylene, in Lesbos, about 600 B. C. He was a contemporary with Sappho, of aristocratic birth, and a vigorous opponent of the tyrants of Mitylene. Banished from home by the tyrant Myrsilus, he traveled in Asia Minor and Egypt. As a writer he was original and his lyrics are pervaded with enthusiasm for justice and freedom.

ALCAMENES (ăl-kăm'e-neez), an eminent sculptor of Athens, pupil of Phidias, who flourished from about 448 to 400 B. C. Pliny, Lucan, and Cicero mention his skill as an artist, and he ranked as one of the great triumvirate of Greek sculptors, including Phidias, Alcamenes, and Polycletus. "Venus Urania" is considered his masterpiece, and he successfully competed with Phidias in a statue of Minerva.

ALCESTIS (ăl-sĕs'tĭs), in mythology, the daughter of Pelias and wife of Admetus, King of Thessaly. It had been decreed that her husband should die, but she suffered voluntary death as his substitute, and was rescued by Hercules from Hades. Euripides made the story of her devotion the subject of one of his tragedies.

ALCHEMY (ăl'kė-mȳ), the ancient name for the science of chemistry, and which in former times was much studied. Modern sciences may be said to date from three discoveries — that of Copernicus, whose effect was to expel the astrologers from the society of the astronomers; the discovery of the weight of the atmosphere by Torricelli and Pascal, which laid the foundation of physics; and the discovery of oxygen by Lavoisier, which destroyed the theory of Stahl, the last alchemist who can be excused for not being a chemist. The objects of former alchemists included the discovery of a universal solvent; the acquirement of ability to transmute all metals into gold or silver, especially the former; and to obtain an elixir or universal medicine which might cure all diseases and indefinitely prolong human life. In this they were open to ridicule rather than the object they aimed at. All these objects were essentially laudable, and it could not be known whether or not they were attainable without vast experiments covering prolonged periods of time. To achieve success in the study of alchemy it was thought necessary for one to obtain first the *philosopher's stone,* which was described as a red powder with a peculiar smell, and was thought to possess the essential property necessary to turn to gold everything with which it came in contact. Though the alchemists failed in their immediate object, they discovered muriatic, nitric, and sulphuric acids, and laid the foundation for the whole science of modern chemistry. A skillful alchemist was called an *adept.* Alchemy flourished in the Middle Ages, but later sank gradually in repute, and ultimately became the object of ridicule to real scientific inquirers and the civilized world at large. However, it is to be noted that when the science of chemistry was fully established there were still many researches for the *philosopher's stone,* by which gold might be produced successfully. Jean Baptiste Dumas (1800-84), the eminent French chemist, thought the necessary solution might be found in the doctrine of molecular isomerism, while Sir Humphry Davy, the celebrated English chemist, refused to give an opinion contrary to its possibility. The much-discussed problem of producing gold as a manufactured product is still receiving attention from some of the leading scientists.

ALCIBIADES (ăl-sĭ-bī'a-dēz), an eminent statesman and general of Athens, son of Clinias and Dinomache, born in Athens in 450 B. C.; died in Bithynia in 404. His father was slain in the Battle of Chaeronea in 497, when his uncle, Pericles, was appointed his guardian. In youth he showed characteristics that indicated future greatness and excellence of character, both in study and physical exercises, while his relationship with Socrates and other distinguished men gave him high standing and many friends. His marriage with the daughter of Hipponicus brought him considerable wealth, but instead of putting it to good use he lived in dissipation, and spent large sums of money in public display, especially at the Olympic games. He took an important part in the Peloponnesian War as a commanding general, especially at the Battle of Delium in 424, where he saved Socrates from the sword of the conquering Boeotians. In 415 he advocated an expedition against Sicily, but before sailing was charged with being implicated in profaning and mutilating the statues of Mercury in Athens. On reaching Sicily with a gallant Athenian army, he was recalled to stand trial, but instead of returning to Athens to make a defense he fled to Sparta and used his energy to defeat his own countrymen. After successful work in organizing the Spartans and raising revolts in their interest, they became jealous of his influence and power, and he was compelled to flee for safety to Persia. To regain the confidence of the Athenians and make his return to his native town possible, he promised Greece the friendship of Persia. Upon communicating this promise, he was recalled and again made general, in which capacity he won a number of brilliant victories, but was again banished after his first defeat. He was assassinated while on his way to the Persian court to enlist aid for his country. Plutarch wrote the history of his life.

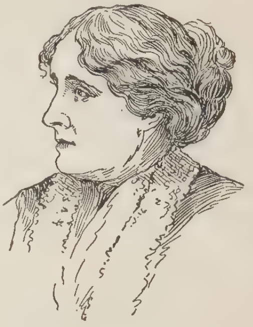
ALCOHOL (ăl'kô-hŏl), the name applied to a series of substances formed of the same elements, alike in essential properties, but varying in composition. Wood alcohol is the simplest form, known in the markets by the name of methyl, and is obtained by distilling wood. While it has nearly the same properties as common alcohol, it has an unpleasant taste and gives off an offensive odor. It is used in manufactures and in the arts as a substitute for common alcohol largely on account of its cheapness. Amyl alcohol, or fusel oil, is made in considerable quantities by the fermentation of potatoes. It has a nauseous fermentation and odor, and is far more poisonous than common alcohol. Methanol is obtained by the synthesis of carbon monoxide, derived from coal, and hydrogen. Ethyl alcohol is the common alcohol made from beer, wine, and other beverages.

Fermentation of sugar or of saccharine matter is the only source of alcohol. Some plants contain free sugar, and others are rich in starch that can be converted into sugar. The vegetable substances best adapted for the manufacture of alcohol are those that contain the greatest abundance of sugar or starch. It cannot be produced in a pure state by a single distillation, owing to its attraction for water and its tendency to mix freely with it. Common spirits, such as brandy, whisky, and others, contain from forty to sixty per cent. of alcohol; in other words, they are about half water and half alcohol. The milder beverages, such as beer, cider, and the light wines, contain from four to fifteen per cent. of alcohol. Distilled liquors are made by a process called distillation. The process requires an apparatus in which the substance to be distilled is heated. The alcohol rises and passes into a coiled tube, called the worm, which is located in a vessel called the worm-tub. The worm-tub is kept full of cold water, by means of which the alcohol passing through the worms is cooled and condensed and flows out of the end of the worm-pipe into a tank. Some watery vapor or steam always passes with the alcohol, hence distilled liquors usually contain from ten to sixty per cent. of water, but this can be largely extracted by a second or third distillation, or by mixing with the alcohol fused chloride of calcium, quicklime, or fused carbonate of potash. If the whole be allowed to stand for twelve hours and then distilled a second time, the resulting alcohol is quite free from water.

Alcohol is employed largely by some schools of medicine, while others discourage its use and claim it possesses no valuable medicinal properties for which some other preparation may not be successfully substituted. It is quite probable that there are conditions under which a limited and careful use of alcohol may be applied for preventive and curative medicinal purposes, though it is very injurious to the young or immature of either sex. Its effect is more marked in females than in males, and in the weak than in the strong. In hot climates it is a prolific source of disease, and scarcely possesses a compensative advantage. The Russian authorities do not permit a man who has indulged recently in the use of liquors to undertake a long march in the cold season. Livingstone found in his exploration tour of Africa that those addicted to the continual use of alcohol are most easily overcome by sustained exertion or excessive heat, while in the celebrated tour of Greely to the North Polar Sea it was proven that users of intoxicants more easily succumbed than nonusers. It is certain that alcohol is not a necessity nor beneficial in cold regions, and the majority of those addicted to it would be more vigorous if they did not use it in any form. Its present employment by mankind is more powerful for evil than good. While this is true, it is certain that alcohol is one of the most valuable products in the culinary arts, in manufactures, and for preservative purposes. According to a report issued in 1928, the four countries consuming the largest quantities of alcoholic beverages per capita rank in the following order: Belgium, England, France and Germany.

ALCOTT (ạl'kŭt), **Amos Bronson,** educator and philosopher, born at Wolcott, Conn., Nov. 29, 1799; died March 4, 1888. He was reared on a farm and in 1828 removed to Boston, where he established a school. His methods were conversational and have been the subject of considerable study. He belongs to a school of philosophy known as transcendental. As a lecturer he visited the principal cities of Eastern Canada and the United States. His publications embrace "Conversations with Children on the Gospels," "Sonnets and Canzonets," "Concord Days," and "Essay on Ralph Waldo Emerson, His Character and Genius."

ALCOTT, Louisa May, authoress, daughter of Amos Bronson Alcott, born in Germantown, Pa., Nov. 29, 1832; died March 6, 1888. She had the advantages of thorough instruction under the guidance of her father, who was an educator, and for some years engaged in school teaching. Her first work, entitled "Flower Fables," was published in 1855, and this was followed by a number of stories written for periodicals published in Boston. She served in the volunteer hospital service during the Civil War, which furnished material for her "Hospital Sketches," and her experiences as nurse were made the basis for several of her interesting tales. Few writers have been able to produce more valuable material for children, and none have attained to greater popularity. Her writings are wholesome in that they give insight into child life and touch many phases of interest to children. Among her best-known works are "Little Women," "Little Men," "Jo's Boys," "An Old-Fashioned Girl," "Under the Lilacs," and "An Old-Fashioned Thanksgiving."


LOUISA MAY ALCOTT.

ALCUIN (ăl'kwĭn), or **Flaccus Albinus,** eminent scholar, born at York, England, about 735; died May 19, 804. He studied under Archbishop Egbert in the Cathedral School of York, where he became familiar with Latin classics. In 766 he succeeded Egbert as archbishop, and in 781 he was invited by Charlemagne to take charge of the famous Palace School, in which he received the name of Flaccus Albinus. He visited with Charlemagne at Parma and founded a number of schools in his empire. His methods and system of organization had a marked influence upon the intellectual development of Europe, especially in France, where he founded a number of schools. He was versed in Greek, Latin, and Hebrew, and is the author of several poems and works treating of theology and philosophy.

ALCYONARIA (ăl-sĭ-ō-nā'rĭ-ȧ), a group of invertebrate animals, mostly marine, in which the stomach and other cavities are united. They comprise a group of coral polyps, and are characterized by having eight tentacles around the mouth. Some writers extend the group to embrace sponges.

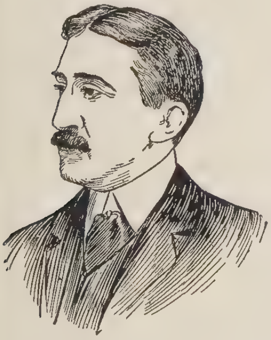
ALDEN (ạl'dĕn), **Henry Mills,** editor and author, born at Mount Tabor, Vt., Nov. 11, 1836. He was a classmate of James A. Garfield and Horace E. Scudder at Williams College, where he graduated in 1857, and later attended Andover Theological Seminary. In 1863-69 he was editor of *Harper's Weekly* and several years lectured on "Structure of Paganism" at Lowell Institute in Boston. His publications include "God in His World" and "Ancient Lay of Sorrow." He died Oct. 7, 1919.

ALDEN, Isabella McDonald, author, known under the pen name of *Pansy,* born at Rochester, N. Y., Nov. 3, 1841. She was educated at Ovid and Auburn, N. Y., and in 1866 married Rev. J. R. Alden. For some years she was on the editorial staff of several religious papers, including the *Christian Endeavor World*. She wrote a number of volumes of fiction and about 75 books for Sunday Schools. Her work entitled "The Prince of Peace" is a life of Christ. Her writings have been translated into the principal European and Asiatic languages.

ALDEN, John, one of the Pilgrim Fathers who landed in Massachusetts in 1620, born in England in 1599; died in 1687. "The Courtship of Miles Standish," written by Longfellow, is based on the romantic incidents of his courtship with Priscilla Mullens. It is related that he proposed marriage to a Pilgrim lady on behalf of Miles Standish, and received the reply, "Prithee, John, why do you not speak for yourself?" The query led to John's becoming the lady's husband. It is said that he was the first of the Pilgrims to set foot upon Plymouth Rock when the Mayflower landed.

ALDEN, William Livingston, author, born in Williamstown, Mass., Oct. 9, 1837. He attended Lafayette and Jefferson colleges, and in 1865 became connected with the editorial staff of the New York *Times*. President Cleveland appointed him consul general of the United States to Italy, where he served efficiently in 1885-89 and was honored by King Humbert, who made him chevalier of the Order of the Crown of Italy. Subsequently he settled in London and was literary correspondent of the New York *Times*. He introduced the sport of canoeing in America. His books include "Domestic Explosions," "Loss of the Swansea," "New Robinson Crusoe," "Life of Christopher Columbus," "The Cruise of the Canoe Club," and "Drewitt's Dream." He died Jan. 14, 1908.

ALDER (ạl′dẽr), a group of trees and shrubs native to the temperate and colder regions, and usually found in wet places. The wood has the property of remaining in an undecayed state for a long time while under water, hence it is used extensively in building sluices, pumps, millwork, and bridges. Tanners find the young roots of value, while the bark is used in the manufacture of bitters, astringents, and medicine useful in treating ague. The young twigs yield dyes of value in coloring different shades of red and yellow.



E. A. ALDERMAN.

ALDERMAN (ạl′dẽr-man), **Edwin Anderson,** educator, born in Wilmington, N. C., May 15, 1861. He graduated at the University of North Carolina in 1882, and afterward at the University of the South and at Johns Hopkins. For a number of years he engaged in the profession of teaching, was superintendent of schools at Goldsboro in 1884-87, and subsequently assistant state superintendent. In 1892 he became professor of pedagogy at the University of North Carolina, and after four years was made its president. He was elected president of the University of Virginia in 1904. In educational circles he is well known as speaker and lecturer. He published "Life of William Hooper" and "School History of North Carolina."

ALDERNEY (ạl′dẽr-nĭ), or **Augrigny,** an island in the English Channel, eight miles from Cape la Hague, France, and about 60 miles from the nearest point in England. The area is three square miles. It is located about 15 miles from Guernsey, another of the Channel Islands. The climate is healthful and mild. The inhabitants are mostly of French extraction and are noted for rearing the Alderney cows, a small breed celebrated for their rich milk. Population, 1921, 2,561.

ALDERSHOT (ạl′dẽr-shŏt), a town in England, in Hampshire, 14 miles east of Basingstoke. Near it is the famous Aldershot military grounds, a permanent camp of the British army, at which splendid maneuvers are conducted in the spring and summer. The town is important as a railroad junction. It has a public library, a number of churches, and several benevolent institutions. Population, 1911, 35,040.

ALDINE EDITIONS, the title of various works published at Venice, Italy, by Aldus Manutius and his family. This family flourished in 1490-1597, and its members became famous as scholars because of the correctness and beauty of their publications. The editions include works of Latin, Greek, and Italian writers, all of tasteful manufacture, and many were counterfeited by printers in France and Italy. The establishment produced 908 works and remained the property of the family more than a century. "The Hours of the Blessed Virgin" is one of the finest productions.

ALDRICH (ạl′drich), **Nelson Wilmarth,** public man, born in Foster, R. I., Nov. 6, 1841. He engaged in mercantile pursuits and entered State politics. In 1875-76 he was a member of the State Legislature. In 1878 he was elected a member of Congress as a Republican, serving until 1881, when he resigned to take a seat in the United States Senate as successor to General Burnside. He was reëlected to the Senate in 1886, 1892, 1898, and 1904. As a politician he ranked as a leader of the conservative element in his party. He died April 16, 1915.

ALDRICH, Thomas Bailey, poet and novelist, born in Portsmouth, N. H., Nov. 11, 1836; died, March 19, 1907. He was employed for some time in a New York counting house, where he began to contribute to various journals, and in 1881-92 was editor of the *Atlantic*

Monthly. His prose is noted for humor and descriptive power, and his verse for metrical perfection and dainty thought. Among his most noted writings are a series of articles contributed to the *Atlantic Monthly,* and publications entitled, "The Bells," "Ballad of Baby Bell," "Cloth of Gold and Other Poems," "Flower and Thorn," "Queen of Sheba," and "Daisy's Necklace."

ALE (āl), a fermented beverage now extensively manufactured, and said to have been made originally in Egypt. It is brewed like beer, and differs from it chiefly in having a smaller proportion of hops. The value of ale depends largely upon the proportion of sugar that is converted into alcohol, which process takes place in part after the liquor has been drawn off into a barrel, hence age greatly increases its strength. See **Beer.**

ALEMANNI (ăl-ê-măn′e), the name applied to a large union of German tribes on the Upper Rhine, with whom the Romans first came in collision in the reign of Caracalla. Dion Cassius was the first to mention them in history, and he describes a victory over them in the year 213 A. D. by Emperor Caracalla. Being powerful and persistent enemies to the Romans and Gauls, they were attacked and defeated by nine Roman emperors at different times, but were never wholly conquered. Their later history is included with that of Germany. The Swabian and Swiss dialects of the German language have been traced more or less distinctly to these people, and the former is known generally as the Alemannic.

ALENÇON (ȧ-län-sôn′), a city in France, capital of the department of Orne, situated near the junction of the Sarthe and Birante rivers. It is well built, has a public library, and is the seat of a church built in the Gothic style, dating from the 16th century. Alençon is noted for the manufacture of artificial flowers, embroidered fabrics, and a point lace known as point d'Alençon. In the vicinity are granite quarries from which fine rock crystal called Alençon diamond is obtained. Population, 1922, 17,378.

ALEPPO (ȧ-lĕp′po), a city of Syria, situated near the northwest extremity of the Syrian Desert. It is a place of great antiquity, and occupies the site of ancient Beroea. After the destruction of Palmyra, it became the great metropolis of trade between the Mediterranean and the nations of the East. The Saracen invaders conquered it in 638 and again in 1260, and in 1401 it was plundered by the Tartars. In 1517 in came into possession of the Turks, under whose dominion it has since remained. At the beginning of the 19th century its population numbered over 200,000, but at present it does not exceed 225,000, of whom 25,000 are Christians and 5,000 Jews. It has a large export trade in cotton, wool, oil, cereals, and live stock. The prevailing language spoken is Arabian.

ALESSANDRIA (ä-lĕs-sän′drê-ȧ), a fortress in northern Italy, capital of a province of the same name, situated near the junction of the Tanaro and Bormida rivers. It is strongly fortified, the citadel being one of the most important in Europe. It has manufactures of silk and linen textiles, woolen goods, porcelain, and machinery. The surrounding country is rich in fruit and flowers. Marengo, the site of a battle in which Napoleon defeated the army of Austria, is not far from Alessandria. The city was founded in 1168. Population, 1901, 71,293; 1922, 73,680.

ALEUTIAN (ȧ-lū′shan), the name of an American archipelago, including about 150 islands, of which about eighty are of considerable size. They are situated west of Alaska, separating Bering Sea from the Pacific Ocean, extending nearly 1,000 miles from east to west, and embracing an area of 6,391 square miles. The islands are of volcanic origin, and contain a number of volcanoes still active. The climate is cold, but somewhat modified by oceanic influences, and the entire group belongs to the United States. Hunting and fishing are the chief occupations, and there is a considerable trade in fish and fur. The natives are known as Aleuts and belong to the Eskimo stock. Most of the inhabitants have embraced Christianity as a result of active work of missionaries of the Greek Church. The Aleutian Islands were discovered in 1741 by Vitus Bering (1680-1741), and were subsequently acquired and occupied by Russia together with Alaska. They came into possession of the United States by the Alaskan purchase in 1867. Population about 8,275. See **Alaska.**

ALEXANDER (ăl-ĕgz-ăn′der), **William,** soldier, known as Lord Stirling, born in New York City in 1726; died Jan. 15, 1783. He entered service as commissary in the French and Indian Wars, and later became aid-de-camp to General Shirley. In 1856 he went to England to prosecute his claim to the earldom of Stirling before the House of Lords, but met with disappointment. He joined the Colonial army at the beginning of the Revolution and was taken prisoner at the Battle of Long Island, but was exchanged in the course of a month. Subsequently he became major general and served with distinction at the battles of Brandywine, Germantown, and Monmouth. He was one of the founders and the first president of King's College, now Columbia University, in New York City.

ALEXANDER, the name of eight Popes, the first of whom, Alexander I., ruled from 109 to 119. The most celebrated of these Popes was Alexander VI., born at Valencia, Spain, in 1430; died in 1503. He became a cardinal at the age of twenty-five years, and was raised shortly after to the dignity of vice chancellor. In 1492, after the death of Innocent VIII., he was elevated to the papal chair. The papal revenues having been weakened, he endeavored to break the power of the Italian princes and to appropriate their possession for the benefit of his own family. A large number of indulgences were sold in his pontificate, and the wills of several cardinals were set aside for his personal benefit. The powerful eloquence of Savonarola was aroused against him, and by pen and pulpit he urged his deposition. The Pope thereupon condemned him to be burned as a heretic in 1498. It is commonly supposed that he died from drinking poisoned wine, which is thought to have been intended for his guests. See **Pope.**

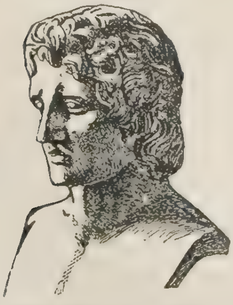
ALEXANDER, the name of three kings of Scotland, who governed between 1107 and 1283. Alexander I., son of Malcolm Canmore, succeeded his brother Edgar in 1107, and died at Stirling in 1124. He encouraged education, secured the independence of the Scottish church, and founded the Abbey of Inchcolm. Alexander II., son of William the Lion, succeeded his father Dec. 4, 1214, and died July 8, 1249. He ranks as a conspicuous figure among Scottish kings on account of his ability and the liberality of his reign. He united the league of English barons against King John, and holds a high place in the history of Scotland. Alexander III., son of Alexander II., succeeded to the throne at the age of eight years, and two years later married the eldest daughter of Henry III., King of England. Owing to his youth, the King of England sought to obtain entire control of Scotland, but this was averted by the energy and wisdom displayed by the young king, and, when he became of age, English ascendency was made impossible. In 1263 Haco, King of Norway, endeavored to grasp from him the Western Isles. He was not only defeated, but ceded to Scotland the Hebrides and the Isle of Man. His rule was eminently successful, and he endeared himself to his subjects on account of justice, wisdom, and liberality. He died as a result of falling from his horse while riding on a dark night in the vicinity of Burntisland.

ALEXANDER, I., Emperor of Russia, eldest son of Paul I., born Dec. 23, 1777; died Dec. 1, 1825. His education was conducted under the care of his grandmother, Catharine II., who afterward intrusted him to the care of Count Nicholas Soltikoff, under whose direction he acquired a liberal education in languages, history, botany, and physics. He ascended the throne on the assassination of his father, in 1801, and proceeded at once to lay the foundation for national culture, systematized organization in government, unshackled industry, induced foreign commerce, and promulgated a new feeling of unity and patriotism. He was concerned in founding institutions devoted to science, the publication and spread of the Bible, and the encouragement of printing in the Russian language. Either as ally or enemy, he was involved in all the great Napoleonic wars. At Austerlitz, in 1805, he personally witnessed the defeat of the allied Russian and Austrian armies. His armies were defeated at Eylau and Friedland in 1807, which terminated in the Treaty of Tilsit. He declared war against England and Sweden in 1809, carried on hostilities in Persia and Turkey, and the following year annexed Finland and some territory on the Danube to his dominion. Napoleon invaded Russia in 1812, but was met by an army of 900,000 and driven out with great slaughter after the burning of Moscow. Russian successes resulted in the fall of Paris in 1814, the consequent abdication of Napoleon, and the restoration of the Bourbons. After the defeat of Napoleon at Waterloo in 1815, Alexander made a second entrance into Paris, where he united with Prussia and Austria in a treaty known as the Holy Alliance. The achievements of Alexander caused the limits of Russian boundaries to become extended in all directions, and resulted in the empire of the czars rising rapidly as one of the greatest powers in the world.

ALEXANDER II., Emperor of Russia, son of Czar Nicholas, born April 29, 1818; died March 13, 1881. He was carefully educated under the direction of his father and mother, the latter being Alexandra Feodorovna, sister of William I. of Prussia, and was early imbued with a spirit for Russian unity. At an early age he was put in charge of an important command in the army and spent much time in traveling for information and to recruit his energies, which had been impaired by an injury to his health received in a military parade. On ascending the throne in 1855, he found the old Muscovite party zealous for war and the more peaceable portion of the nation ardent for peace, which put him in a critical position, but his sympathies were with the latter. In 1861 he emancipated 23,000,000 serfs by proclamation, and in 1865 established elective representation in the provinces. His decided sympathy with the Slavonic people under Turkish rule, and the atrocities perpetrated by the Turks on Greek Christians, caused a war with the latter in 1877-78, when he took the field in person. Being a liberal and humane monarch, he was supported by the conservative element, but met with opposition from those more eager to secure radical reforms. Three attempts to assassinate him were made; the first in Paris by a Nihilist in 1867 proved unsuccessful; the second in 1879, when he was shot at in his own capital, was also unsuccessful, but in 1881 he was fatally injured by a bomb thrown at him near his palace, from the effect of which he died shortly after.

ALEXANDER III., Emperor of Russia, son of Alexander II., born March 10, 1845; died at Livadia, in the Crimea, Nov. 1, 1894. He received a liberal education in languages, arts, and sciences, and ascended the throne on the assassination of his father in 1881. His fear that Nihilists would attempt to assassinate him caused him to live in close retirement for some time at Gatschina, but on May 27, 1883, the coronation took place at Moscow. He suppressed Nihilism, developed remarkable military power, kept a carefully tabulated system of supervision over Asiatic countries, and extended the boundary of Russia in Asia. However, his reign was comparatively an uneventful one. In 1892 he made an extended visit with the German emperor, and later entered with Germany and Austria in the Dreikaiserbund, a compact whereby the three powers were pledged to maintain the peace of Europe. He encouraged railroad building, commerce, manufactures, and educational arts. His eldest son, Nicholas II., succeeded him.

ALEXANDER THE GREAT (ăl-ĕgz-ăn'-der), son of Philip of Macedon, born at Pella, in 356 B. C.; died in 323. He was tutored under a Greek scholar, studied the "Ilaid," and at the age of thirteen was placed for three years under the instruction of Aristotle, who was his devoted friend. His father permitted him to share in the government of the kingdom, and gave him a military temper by permitting his attendance on several battlefields. His bravery decided the issue of battle at Chaeronea in 338, and at the age of twenty years he ascended to the throne more than his father's equal in statesmanship and military skill. When Thebes revolted, he leveled the city to the ground and sold its inhabitants into slavery, sparing only the house of Pindar, the poet. This terrible example quieted all opposition. He at once became commanding general of the Grecian forces, and set out on a perilous expedition in 334 to invade Persia. With an army of 35,000 brave warriors he crossed the Hellespont, and was the first to leap on the Asiatic shore. After defeating the Persians at Granicus and Issus, he turned south and besieged Tyre. After building a stone pier several hundred feet wide and half a mile long for the purpose of crushing the walls, his army made an assault and succeeded in taking the city. Egypt was conquered soon after, in which country he founded the city of Alexandria. From Egypt he marched upon the city of Babylon, which he conquered after considerable resistance, and subsequently burned Persepolis to avenge the destruction of Athens 140 years before. Still anxious to conquer, he pressed further east, exploring, conquering, and founding cities until his army refused to proceed further into the unknown regions. His troops returned to Greece through Baluchistan, while he descended the Indus, reaching Babylon 10 years after crossing the Hellespont. He died at Babylon, while planning a second invasion of Arabia.


ALEXANDER THE GREAT.

Alexander had in view the massing of a vast empire by molding the diverse nations which he had conquered, and dreamed of making Babylon its capital. He married Princess Roxana, the daughter of Oxyartes, induced many of his army to marry Persians, and sought to cement a relationship between the Greeks and Persians. The result of his reign has not yet disappeared. Great cities founded under his command are still centers of commerce. The culture of Greece was spread over the Orient, and the Greek language became the medium of communication among the educated people from the Adriatic to the Indus. His military achievements have caused his name to be written indelibly in history. Not only are his achievements to be estimated by conquering the known world, but also by the landmarks that have endured the centuries. The north of Africa, the west of Asia, and the east of Europe were all under his dominion, and he was the ruler and sovereign of a vast region and large populations. It had been foretold by oracle that whoever could untie the gordian knot, at Gordium, would be the ruler of the world, and to inspire awe he cut it with his sword. Darius, the powerful king of Persia, surrendered his army of 500,000 and was compelled to recognize him as ruler of all his empire, while Babylon and India were reduced to meek submission. He carried industry, manufacture, and commerce to remote regions and Hellenic civilization to Egypt. When asked to whom his throne should descend, he answered, "To the worthiest." His empire was divided among his generals, and Ptolemy, the most famous of his commanders, founded a dynasty in Egypt.

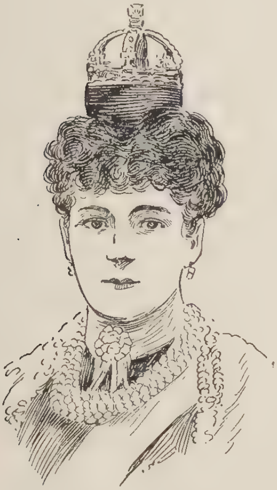
ALEXANDER, King of Greece, second son of Constantine I., born Aug. 1, 1893. He was liberally educated. His father was thought to be pro-German, although he declared himself neutral, and the treaty powers—that is England, France and Russia—deposed him in 1917. Alexander was placed on the throne. He severed diplomatic relations with the Central Powers, and it was declared that a state of war existed with them.

ALEXANDER NEVSKI (nef'ske), prince and hero, born at Vladimir, Russia, in 1220; died Nov. 14, 1263. He was the son of Prince Yaroslav of Novgorod, and showed bravery in resisting the Mongols. In 1240 he was sent to the western frontier against an army of Danes, Swedes, and Teutonic Knights, receiving the surname of Nevski from his victory over the Swedes on the Neva.

ALEXANDER SEVERUS, Roman emperor, born in 205; died in 235. He was carefully educated under the direction of his mother, Julia Mammaea, and sought the society of the learned. In 222 he was proclaimed emperor by the pretorian guards and confirmed by the

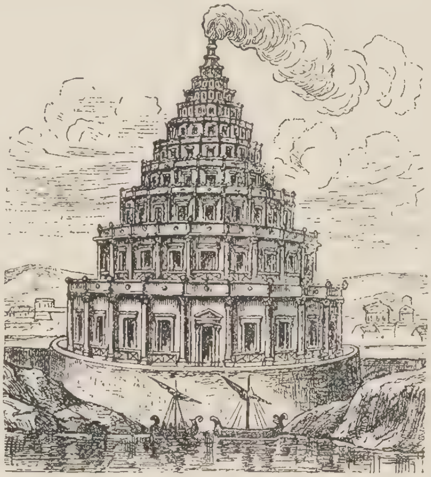
Senate. He commanded an army against the Persians in 233 and the following year marched against the Gauls and Germans. During an insurrection among his troops, headed by Maximin, he was waylaid and murdered. Maximin succeeded him as Emperor of Rome.

ALEXANDRA (ăl-ĕgz-ăn′drȧ), **Caroline Marie,** Queen of England, born in Copenhagen, Denmark, Dec. 1, 1844. Her father, King Christian IX. of Denmark, provided the means by which she received a careful and liberal education, and in 1863 she was married to Albert Edward, Prince of Wales. In 1866 she was present at the opening of Parliament. When the Prince Consort died, in 1861, Queen Victoria withdrew from society and she became the leader of social life in government circles. When Albert Edward ascended the throne, in 1901, as Edward VII., she became Queen of England. She held the degree of doctor of music and was an accomplished musician. She died in England Nov. 21, 1925.



ALEXANDRA, QUEEN OF ENGLAND.

ALEXANDRIA, an important city of Egypt, on the Mediterranean Sea, 112 miles northwest of Cairo, and seven miles west of the Canopic mouth of the Nile. The city was founded by Alexander the Great after the destruction of Tyre, in 332 B. C., and at one time had a population of fully a million people, possessed great wealth, and was cultured by learning and civilization. It became celebrated for its lighthouse, situated on the island of Pharos, reckoned among the seven wonders of the world, and the island itself was connected with the mainland by a dike, through which vessels could pass by means of movable bridges. Much of its early success was due to Greek scholars, who fostered learning and aided in founding its great library. After the death of Alexander the Great, it became the residence of the Ptolemies and was next to Rome and Antioch the most magnificent city of antiquity. At this time it rose to prominence as the seat of Grecian learning and literature, which not only augmented its material prosperity, but spread its influence over the greater part of the ancient world. The Romans came into possession of it about 30 B. C., from which period dates the decline of the city, largely because its wealth and treasures were carried to Rome, and many of its institutions were laid waste and pillaged. Besides, the rise of Constantinople, its powerful rival, aided in the declining tendency. The city wasted away so rapidly that in the 4th century A. D. the only building of any importance remaining was the Temple of Serapis. In the 7th century it was sacked by the Arabs, and in the 9th century was conquered by the Turks. It had a population of only about 6,000 in 1778, but soon after the conquest of Egypt by the French it began to regain importance.



PHAROS LIGHTHOUSE, ALEXANDRIA.

The modern development of Egypt has again placed Alexandria with the foremost commercial cities on the Mediterranean. Among the causes affecting its modern growth may be named the discovery of America, the passage of commerce from India by the way of the Cape of Good Hope, and the construction of the Suez Canal. The foremr two had a more or less depressing effect by diverting its trade with India, but the building of the Suez Canal more than compensated by giving to the prosperity of Egypt a decided impetus. The present city is not situated on the exact site occupied by ancient Alexandria, but is built mostly on the island of Pharos and the mole connecting it with the land opposite. Though the mole was originally an artificial dike, it has been broadened by alluvial deposits into a considerable stretch of land, and occupies a position between the two harbors. Formerly two obelisks, known as Cleopatra's needles, sculptured in the time of King Thothmes III., in the 16th century B.C., adorned the city, but these have been transported, one to the United States and the other to England. The city has exports valued at $17,500,000, and imports aggregating about one-half that amount. It is the focus of many railways, and has rapid transit, electric lights, and other modern facilities. Among the leading exports are cotton, sugar, rice, grain, and fruits.

The manufactures are chiefly clothing, utensils, jewelry, chemicals, toys, and articles of food. Its inhabitants are greatly diversified, including Turks, Greeks, Arabs, Persians, and many European tradesmen. Population, 1922, 445,882.

ALEXANDRIA (ăl-ĕgz-ăn'drĭ-å), a city of Indiana, in Madison County, 48 miles northeast of Indianapolis, on the Nickel Plate and the Big Four railways. It is surrounded by a farming and stock-raising country and has a growing trade in produce and merchandise. The manufactures include glass, clothing, ironware, and machinery. Waterworks, sewerage, electric lighting, and pavements are among the public utilities The first settlement in its vicinity was made in 1834. Population, 1900, 7,221; in 1920, 4,172.

ALEXANDRIA, a city in Louisiana, capital of Rapides parish, on the Red River, about 195 miles northwest of New Orleans. It is on the Southern Pacific, the Missouri Pacific, the Texas and Pacific, and other railroads. Having excellent highway and railway facilities, it trades in large quantities of fruits, cotton, rice, and sugar. There are a number of fine parish and school buildings, numerous churches, and many municipal conveniences. Among the manufactures are tobacco products, machinery, and ironware. Alexandria was settled in 1820 and incorporated in 1840. Population, 1900, 5,648; in 1920, 17,510.

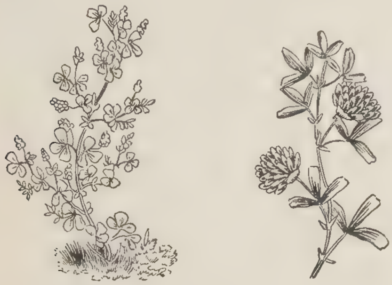
ALEXANDRIA, a city of Virginia, county seat of Alexandria county, on the Potomac River, seven miles south of Washington, D. C. It has transportation facilities by steamboat lines and by the Baltimore and Ohio, the Pennsylvania, the Southern, and the Chesapeake and Ohio railways. The streets are regularly platted, and improved by parks and electric lights, pavements, waterworks, and an extensive system of street railways. There are manufactures of machinery, tobacco products, earthenware, clothing, and farming implements. The features include the George Washington Masonic Memorial, erected at a cost of $4,000,000. General Braddock made it his headquarters in 1755, and the citizens contributed to the British in 1814 in order to save themselves from an attack by a fleet. Federal troops occupied the city during the Civil War. Population, 1900, 14,528; in 1920, 18,060.

ALEXANDRIAN LIBRARY, the most remarkable and largest collection of books of antiquity, founded by Ptolemy Soter in Alexandria, Egypt, and greatly enlarged by succeeding Ptolemaic rulers. It embraced the collected literature of Egypt, India, Greece, and Rome, and at the time of its first manager, Demetrius Phalereus, contained 50,000 volumes, but was subsequently enlarged to 700,000. A part of the library was situated in a museum in the portion of the city called Bruchium, near the royal palace of the Ptolemies, and the other part was in the temple of Jupiter Serapis. The former portion was destroyed in the siege of Alexandria by Julius Caesar, but was largely replaced by Mark Antony and presented by him to Queen Cleopatra. The portion of the library situated in the temple of Jupiter Serapis was destroyed in the time of Theodosius the Great, and the collection of Mark Antony was burned in 640, when the city was conquered by the Arabs. Some writers contend that this portion of the library was destroyed by fanatical Christians in 391, who were led by Archbishop Theophilus. See **Libraries.**

ALEXANDRIAN SCHOOL, a term used to designate the age or time, after the decline of Greece, when Alexandria, Egypt, became the seat of science and literature. It is usually divided into two periods, the first embracing the reign of the Ptolemies, from 323 to 30 B. C., and the second from 30 B. C. to 640 A. D., including the Roman supremacy and ending with the conquest by the Arabs. To the founder of the Alexandrian Library, Ptolemy Soter, is also ascribed the introduction of science and literature. The grammarians and poets of this period included Egyptians, Greeks, and Jews, and later also Romans. Their chief aim was to collect and preserve for future generations writings then existing, and to add to these the literature of subsequent years. The language of Alexandrian writers was remarkable for correctness, purity, and elegance of expression. Though distinguished for fine rhetoric, their productions lacked the spirit that animated Greek poetry. In a school where imitation and rule were substituted for inspiration, each generation became more artificial and lifeless than preceding masters. However, the school was long distinguished for culture in mathematics, astronomy, and physical sciences. It was here that Euclid in the 3d century B. C. wrote his great work on geometry, and Archimedes, Eratosthenes, and Philadelphus declared well-established mathematical and scientific principles. For four centuries the Alexandrian School was the chief seat of learning and science of the world, and from its origin to its fall includes a period of 1,000 years.

ALEXANDRIAN VERSION, or **Alexandrian Codex,** an important manuscript written on parchment with uncial letters, now in the British Museum. It constitutes a transcript of the Old and New Testaments in the Greek language, but there are some omissions from the New Testament. The Old Testament is written in the translation known as the Septuagint, and, in connection with it, are epistles of Clemens Romanus. The manuscript is thought to date from the 6th century.

ALFALFA (ăl-făl'få), or **Lucerne,** a deep-rooting clover-like perennial plant. It is cultivated extensively for forage in America and in the European countries bordering on the Mediterranean Sea. Owing to rooting deep into the ground, it is the best known plant for dry localities, and is profitably cultivated in such regions. It yields from two to fifteen tons of fodder per acre, and has the advantage of being both nourishing and healthful as a food for stock. The stem is upright and branching, the leaves are purple colored, and the flowers grow in clusters. It has been cultivated in Europe as a forage plant more than 2,000 years and is grown extensively in the arid regions of Nebraska, Kansas, Texas, Colorado, and other states.

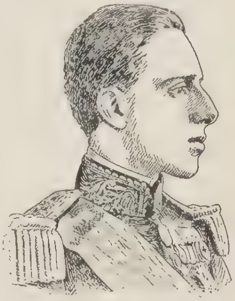


ALFALFA.
Hop-Lucerne. Sand Lucerne.

ALFIERI (äl-fē̇-ā'rē̇), **Vittorio,** tragic poet, born in Piedmont, Italy, Jan. 17, 1749; died in Florence, Oct. 8, 1803. His early education was limited, but later he studied Latin and went to Tuscany to acquire the Tuscanian dialect. On his way thither he became attached to the Countess of Albany, through whose influence he secured the advantages that led to his success and poetic excellence. He may be classed as the first tragic writer of Italy. "Cleopatra" was his first production, and "Saul" the most successful. His entire works include twenty-one tragedies, six comedies, several epics and lyrics, and numerous translations from ancient classics, chiefly from the Greek and Roman.

ALFONSO (ăl-fŏn'so), the name of a large number of kings of Portugal and Spain. There were five sovereigns in Aragon, six in Portugal, and twelve in Leon and Castile bearing this name. Alfonso I., the earliest king of Portugal bearing this name, was born in 1110; died in 1185. He conquered the Moors in 1139, and eight years later took Lisbon. Alfonso X., King of Leon and Castile, was born in 1221; died in 1284. After storming Seville in 1248 and achieving other successes, he became a pretender to the imperial throne of Germany, but was defeated by Rudolph of Hapsburg. He was noted as a poet, astronomer, and philosopher.

ALFONSO XIII, King of Spain, son of Alfonso XII., born May 17, 1886. His father became King of Spain in 1876, and in 1879 married the Archduchess Maria Christina of Austria, but died in 1885. Alfonso XIII. was born posthumously. He was recognized as King of Spain at birth under the regency of his mother, under whose care he received a liberal education. The early years of his reign were disturbed more or less by the pretensions of the Carlists to the throne, and in 1898 occurred the Spanish-American War, which resulted in the loss of the last Spanish possessions in America. Alfonso ranks as a progressive sovereign, and has manifested considerable interest in industrial development. In 1906 he married Princess Ena of Battenberg, a relative of William II. of Germany and a granddaughter of Queen Victoria of England.



ALFONSO XIII.

ALFORD (ăl'fẽrd), **Henry,** biblical critic and poet, born in London, England, Oct. 7, 1810; died Jan. 12, 1871. He studied at several universities and in 1856 was made dean of Canterbury. His reputation as a biblical critic is based on his edition of the Greek New Testament, which was published in 1852, and in which he made liberal use of the treasures of German learning. He was not only a literary critic and editor, but was efficient in painting, music, and carving. His books include "New Testament for English Readers," "A Plea for the Queen's English," "Homilies on the Acts of the Apostles," "Letters from Abroad," and "The School of the Heart, and Other Poems."

ALFRED THE GREAT, King of the West Saxons, born at Wantage, in Berkshire, in 849; died Oct. 28, 901. He became king at the age of twenty-two years, at a time when the country was disturbed by a war with the Danes, and a month later met the enemy at Wilton, where, after a long struggle, he was defeated. Both parties being tired of war, a treaty of peace was concluded, and the Danes withdrew to London. In 878 a second war broke out with the Danes, but he defeated them with great loss at Eddington, and again in 894, when the Danes were commanded by Hastings. Alfred was a military genius and a devout Christian, and sought to promote justice and peace for the welfare of his country. He translated a number of works which he thought would be useful to his people, including Orosius's "History of the World," and Boëthius's "Consolation of Philosophy." Edward the Elder, his son, succeeded him as king.

ALGAE (ăl'jē), the general name applied to numerous plants that grow in water, both fresh and salt, comprising seaweeds and other species. In size they range from forms too small to be seen by the naked eye to the giant kelp common to the west coast of America, which attains a length of from 800 to 1,500 feet. They are devoid of true roots, and usually adhere to the bottom of the water or to rocks, and frequently are seen afloat on the surface. In structure they are of cellular tissue, as the common carrageen, which, when bleached, is the Irish moss of commerce. This plant and many others are edible. Some species are used in the manufacture of iodine, kelp, and bromine, and many are of value as manure. Masses of gulfweed many miles in extent are met by navigators, such as the Sargasso Sea. Most species common to salt water are brown or red, and the fresh-water plants are greenish in color.

ALGEBRA (ăl'jẻ-brȧ), a branch of pure mathematics, which, like arithmetic, treats of numbers. This department of mathematics enables one to generalize by the aid of symbols, and therefore to abbreviate the method of solving propositions relating to numbers. It is a valuable medium in the solution of intricate problems, and by means of it results can be obtained that by arithmetic are impossible. Comte defines algebra as the calculus of function, to distinguish it from arithmetic, which he defines as the calculus of values, but this definition places some algebra in common arithmetic and some arithmetic in school algebra. However, in practice, this condition now exists in many common schools, since authors of texts in arithmetic have introduced more or less extensive applications of algebra with each division of arithmetic.

The symbols used in algebra are of three kinds, those of quantity, those of operation, and those employed as abbreviations for ordinary words. Symbols of quantity may be *known* or *unknown*, and consist of letters of the alphabet and of ordinary numbers, as $2a+3b$ *by* $2a-3b$, meaning that the former quantity is to be multiplied by the latter. Numerals or the first letters of the alphabet are generally employed to represent known quantities, as a, b, c; and the last letters of the alphabet to represent unknown quantities, as x, y, z. The symbols of operation are $+$, $-$, $\times$, $\div$, $=$, etc., and the symbols used as abbreviations are $\sqrt{}$, denoting square root; $\sqrt[3]{}$, cube root, $<$, greater than, etc. The divisions of algebra are addition, subtraction, multiplication, division, involution, evolution, and equations, though some authors of text-books and many institutions of learning make the last mentioned a distinct branch of study.

An equation is the statement of the quality of two algebraic expressions, the expression to the left of the sign of equality being the first member and the one to the right of the sign being the second member. Equations are designated by degree: one of the first degree is called a simple equation; of the second, quadratic; of the third, cubic; of the fourth, quartic or biquadratic, etc. It has long been possible to solve general equations of the second, the third, and the fourth degree, but whether an equation of the fifth degree can be solved was in dispute for many centuries. This question was finally settled by Niels Henrik Abel (1802-29), an eminent Norwegian mathematician, who demonstrated the impossibility of solving general equations of any degree higher than the fourth. However, it is possible to construct special equations of the fifth or of a higher degree which admit of being solved, but such problems belong to the highest branch of algebra. Diophantus of Alexandria, Egypt, is thought to have originated this science in the 4th century, when that city was the seat of culture and learning. Europeans first learned of algebra from the Arabs, who derived it from the Hindus. The work from which Europeans drew largely was that of Mohammed Ben Musa, who lived in the 9th century. Leonardo Bonaccio, an Italian merchant, while traveling in the East, about 1200, acquired a knowledge of algebra, and on his return introduced it among his countrymen. Later it was introduced into all European countries, and its signs and symbols were greatly enlarged. It began to be taught with much enthusiasm in the early period of the revival of learning. It was first applied in a case of one cubic equation in 1505, later to two cubic equations, and still later to biquadratic equations. Descartes applied algebra to geometry, and was the first to represent the nature of curves by means of equation. Other eminent scholars applied algebraic methods to the sciences, including formal logic, economics, and psychology.

ALGECIRAS (ăl-jẻ-sē'rȧs), a city of Spain, in the province of Cadiz, six miles west of Gibraltar. It is important as a seaport, has a well-protected harbor, and carries on a profitable trade. The Moors seized it in 711, and it remained in their possession until 1344, when it was beseiged and captured by Alfonso XI. It was the seat of the Algeciras Conference in 1906, which considered the rival claims of Germany and France in Morocco. Population, 1922, 12,986.

ALGER (ăl'jẽr), **Horatio,** author, born at Revere, Mass., Jan. 13, 1834; died July 18, 1899. He studied at Harvard University, where he graduated in 1852, and afterward completed a course by graduation at the Harvard Divinity School. In 1864 he became pastor of a Unitarian church at Brewster, Mass., but after two years removed to New York, where he gave his time largely to literary work. His writings consist largely of juvenile literature and he published about seventy books, of which about 800,000 copies were sold in America and Europe. Among his books are "Do and Dare," "Luck and Pluck," "Tattered Tom," and "Paul Preston's Charge."

ALGER, Russell Alexander, soldier and statesman, born in Lafayette, Ohio, Feb. 27, 1836; died Jan. 24, 1907. After attending the public schools, he studied law and was admitted to the bar, and in 1859 began to practice his profession at Cleveland. He enlisted for service in the Union army in 1861, when he was made captain in the Second Michigan cavalry, and before the war closed he was made a brevet major general. He distinguished himself at Gettysburg and in the Shenandoah Valley. After the war he settled permanently in Detroit, Mich., where he became wealthy in the lumber business, and in 1884 was elected Governor of the State as a Republican. He was an unsuccessful candidate for the nomination for President in 1888. In 1889 he was chosen commander in chief of the Grand Army of the Republic. President McKinley appointed him Secretary of War in 1897, which position he resigned two years later. The Spanish-American War was in progress while he administered the department, and he was severely criticised as being indirectly responsible for the unsanitary condition of many camps. In 1902 he was appointed United States Senator and was elected to a full term the following year.

ALGERIA (ăl-gē'rĭ-ȧ), a colony of France in North Africa, bounded on the north by the Mediterranean Sea, east by Tunis and Tripoli, south by the Sahara Desert, and west by Morocco. The length from east to west is about 550 miles and it extends inland about 375 miles. It has an area of about 343,500 square miles, but the area exclusive of the Sahara region is 184,474 square miles.

DESCRIPTION. Algeria comprises a portion of the plateau of North Africa, which rises from the sea in three terraces, but along the Mediterranean is an extensive and fertile coast plain. The Atlas Mountains traverse the entire northern part from east to west in two chains, known as the Great Atlas and the Middle or Maritime Atlas. These chains are more or less parallel to the coast, the former bordering on the Sahara and the latter trending between it and the sea. The Great Atlas includes some of the highest summits of Algeria, as Mount Shelia, which is 7,600 feet above sea level. Deep and tortuous defiles furrow the mountains in many places. The portion of the Sahara lying within Algeria is a rocky plateau with an elevation of about 1,500 feet. All of the streams are small and unimportant. They are confined almost exclusively to the coastal plain of the north, since the region included in the Algerian Sahara is arid. The Sheliff, which flows into the Mediterranean near Mostaganem, is the largest river. Numerous small lakes abound in the highland, some of which are saline and have deposits of salt on the bottom during the dry season.

The climate is moderate and healthful, but it varies largely with differences in elevation and local peculiarities, being generally arid toward the south and moderately humid in the northern part. The most productive and best watered section of the country is along the sea, extending inland about fifty miles, and most of the European settlements are within this belt. This section has a moderate temperature, but the summers as a whole are hot and dry. A large number of fertile oases are located in the desert on the south slope of the highlands. They are covered with vegetation and are well watered, but the greater part of the desert is devoid of vegetation and unfit for occupation.

PRODUCTIONS. Many minerals abound in the highlands, but mining has not been developed to any great extent. The more extensive deposits are those of iron, copper, zinc, lead, and quicksilver. Building stone, especially granite, is found in large quantities. Extensive deposits of salt occur in the southern part. Agriculture and stock raising are the leading industries, and these enterprises are largely in the hands of natives, while commerce is monopolized by Europeans, mostly Frenchmen. Wheat is the leading cereal, but comparatively large interests are vested in growing barley, oats, potatoes, alfalfa, and grapes. Other products include coffee, tobacco, onions, and fruits. A fine grade of horses are reared for draft purposes. Other domestic animals include cattle, sheep, camels, and poultry.

Algeria has large interests in timber and is an exporter of lumber and lumber products. As a wine-producing country it takes high rank, and it has manufactures of pottery, cotton and woolen textiles, clothing, utensils, and esparto goods. The foreign trade is chiefly with France, Great Britain, Spain, Italy, and Germany. The leading exports include cereals, wine, minerals, cork, alfalfa, and live stock. Among the imports are clothing, furniture, textiles, and machinery. Railroad building has received marked attention under grants made by France, and the lines in operation in 1922 included a total of 2,250 miles. Tramway lines have been constructed in the larger cities and in some of the mining districts, and a system of national highway has been inaugurated.

GOVERNMENT. The administration is vested in a governor general, who is responsible to the national assembly of France. He is assisted by a ministry, although a part of the territory is governed under military rule. For the purpose of government the country is divided into three provinces, called departments. These include Algiers, Constantine, and Oran. Each department has its own council, and these councils send delegates to the superior council, which meets annually at Algiers. Judicial authority is exercised by justices of the peace, commercial courts, courts of first instance, and a court of appeal located at Algiers. As a whole the country is organized and governed under the system of French laws, both in civil and criminal affairs. The state gives support to education and religion, but the instruction in elementary schools may be either in French or Arabic. Several institutions of higher learning and a number of commercial and technical schools are maintained under encouragement by the government.

Inhabitants. Although Algeria has been a dependency of France since 1830, only about 350,000 of the inhabitants are French, and the total foreign population is given at 765,500. The two chief classes are Arabs and Berbers, the former being largely nomadic and engaging extensively in pastoral occupations. Formerly the region was occupied wholly by Berbers, who are generally termed Kabyles, and there are parts of the country which are still occupied almost exclusively by these people. The Berbers have a language peculiar to themselves, but they have been influenced more or less by the Arabs and Jews and use the Arabic characters in writing. Mohammedanism is the prevailing religion, but Judaism is well represented and many of the natives profess Christianity. A small element of the inhabitants consist of Negroes and Turks. Algiers, the capital of Algeria and of the department of Algiers, is the largest city. Other cities include Oran, Constantine, Bona, Mustapha, Tlemcen, and Gardaja. Population, 1922, 5,231,850.

History. The region occupied by Algeria was known to the Romans as Numidia, but anciently it included Tunis. The Vandals conquered it in 430 A. D., but it was occupied by an army of the Byzantine Empire in 533, and became a possession of the Saracens in the 7th century. When the Jews and Moors were driven from Spain by Ferninand and Isabella at the close of the 15th century, large numbers of them located in Algeria, where they developed the arts and industries of the Europeans. Spain undertook a war against Algeria at the beginning of the 16th century, and by 1510 made much of the country tributary. The Turkish pirate, Horush Barbarossa, made himself Sultan of Algeria in 1516, but he was captured soon after and beheaded by the Spaniards. In the 16th century the country became a part of the Turkish domain, but the Turks did not establish complete supremacy over all the tribes, and in 1830 it became a colonial possession of France. At the time of the Franco-German War, in 1870-71, an uprising took place to throw off the dominion of France. Subsequently other attempts were made to secure independence, but in the main the country has been prosperous and peaceable. French occupancy has greatly facilitated commerce and manufactures, extended internal improvements, and stimulated a devlopment of the natural resources.

ALGIERS (ăl-jērz′), a seaport city on the Mediterranean, capital of Algeria, on the west shore of the Bay of Algiers. It occupies a fine site on the slope of a hill fronting the sea, the mountains back of it giving a beautiful background effect. The city consists of two parts, the old and the new divisions. In the former the streets are platted irregularly, giving an Oriental appearance, while the latter was planned and built by the French and is both modern and beautiful. Four aqueducts supply water, and the newer part of the city is lighted with gas and electricity. The old part is built in the Moorish style, and the architecture is plain from the outside, but the interiors are beautifully decorated in the Moorish art. Formerly the city had about one hundred mosques, but they have been partly displaced by synagogues and Christian churches. Among the educational institutions are schools of science, law, and medicine, and many secondary schools are maintained by the French and the Mussulmans. The harbor is well fortified and spacious, furnishing landings for a large number of vessels. Considerable export trade is carried on with France and other European countries, and it is the most important coaling station on the Mediterranean. Tourists visit Algiers in large numbers during the winter, owing to its pleasant and healthful climate. Population, 1906, 138,240; 1922, 172,397.

ALGOA BAY (ăl-gō′a), an inlet on the southeastern coast of Africa, in Cape Colony, about 425 miles east of the Cape of Good Hope. The Sunday and Baasher rivers discharge into it, and it affords excellent anchorage for vessels. On the west coast is Port Elizabeth, near Cape Recife, which is the seat of a considerable export and import trade.

ALGONKIAN (ăl-gŏn′ki-an), a division of geologic time, preceded by the Archaean and succeeded by the Cambrian. Traces of this period are most distinct in the vicinity of Lake Superior, both in the United States and Canada, and its name was derived from the Algonquin Indians who originally inhabited that region. The rocks are sedimentary and metamorphic, and consist chiefly of marble, schist, geneiss, quartz, granite, and conglomerates. Few fossils occur and those found are indistinct. In some regions volcanic rocks are imbedded in shale and limestone, while in other sections rich deposits of copper and iron are abundant, the former particularly in Upper Michigan and the latter in Northern Minnesota. The Hudson Bay country, Ontario, New England, and the Black Hills have large areas of the Algonkian system.

ALGONQUINS (ăl-gŏn′kwĭnz), a family of North American Indians, the most prominent of three aboriginal races found in the great basin of the Saint Lawrence. They include the Mohegans, Pequots, and Narragansetts of New England; the Delawares, Powhatans, and Shawnees; and many tribes living in the vicinity of the Great Lakes. During the Colonial period they were friendly to the French and fought against the English, especially in the French and Indian wars, but later they became greatly scattered. At present about 81,200 of these Indians are living, the larger part of which are in Canada, notably in the provinces of Quebec and Ontario. The tribe known as Algonquins has dwindled down to about 1,200, and about two-thirds of these are in Canada.

ALHAMBRA (ăl-hăm'brȧ), a noted palace in Spain, situated about a mile from the city of Granada, to which it forms a citadel or acropolis. It was formerly the residence of the Moorish kings. It was founded and commenced by Ibnu-l-ahmar, and completed about 1348. There are two oblong courts; the smaller one, known as the Court of the Lions, contains a fountain ornamented with twelve lions in marble, and is 66x115 feet; the other, called the Court of the Blessings, is 74x138 feet. The Alhambra is surrounded by gardens, in which are beautiful waterfalls, exquisite fountains, and decorative vines. Within are gorgeous colorings, whispering galleries, and geometrical designs interwoven with passages from the Koran. An Arab poet likened the Alhambra to "a pearl set around with emeralds," while it was once described as "the gem of Arabian art in Spain, its most beautiful and most perfect example." Washington Irving's "Alhambra" is the best known description written of this place in the English language.

ALI-IBN-ABU-TALIB (ä'lē-ĭb'n-ä-bo͞o-tä'-lēb), eminent Mohammedan, born at Mecca about 602; died in 661. He was a cousin of Mohammed and one of the early converts to the faith of Islam. He married Fatima, the daughter of Mohammed, and was expected to become the first caliph, but was preceded in that office by Abu Bekr, Omar, and Othman. As caliph he was brave and faithful, but his term of office was characterized by opposition and contention on account of sects that began to form. His followers came to be known as Shiites and their most powerful opponents were the Sunnites. The Shiites are at present most numerous in Syria, India, Afghanistan, and Persia, while the Sunnites are represented largely in Turkey and Northern Africa. The Fatimites, believed to be descendents of Ali and Fatima, ruled in Egypt for many years.

ALIAS (ā'lĭ-ȧs), a term used in law to designate a name assumed by a person who wishes to conceal the name by which he passes or is known. An alias is usually assumed for purposes of deception, though this is not always the case, as it is quite proper under certain conditions to employ an alias, such as pseudonyms adopted by writers, stage names used by actors, and descriptions employed by detectives, all of which are properly comprehended under the term. The name is frequently used in law to describe a writ given after one of the same kind has been issued for an identical purpose.

ALICANTE (ä-lē-kän'tȧ), a city of Spain, in the province of Alicante, located on the Mediterranean. Many of the buildings are of stone, and the streets are well improved and regularly platted. It is well fortified and ranks next to Cadiz and Barcelona as a seaport in Spain. The manufactures include tobacco, clothing, and machinery, and the city has a large trade in grain and fruit. It is the seat of two nunneries, a collegiate church, and several consulates. The Romans named it Lucentum. Population, 1920, 50,495.

ALIEN (āl'yen), a term used to designate a person born outside of the jurisdiction of the country in which he resides and who has not acquired the full rights of citizenship. In Great Britain the alien may become a citizen under the Naturalization Act of 1870. On the other hand, in the United States, the status of an alien is determined under the provisions of the National Constitution, or under the Constitution of the State in which such alien may reside. An alien, even after naturalization, is restricted in a number of respects, as, for instance, he is not eligible to a seat in Congress until after seven years after naturalization, and may not hold the office of President or Vice President.

ALIEN AND SEDITION LAWS (sē-dĭ'-shŭn), the name applied to certain enactments of Congress passed in 1798, while John Adams was President. They raised the number of years necessary for naturalization from five to fourteen; provided for the arrest of subjects of any foreign power with which the United States should be at war; provided for the punishment of any person maliciously slandering the government or any of its officers, and gave the President power to banish or arrest any aliens he might deem dangerous. These laws proved a political blunder and were never enforced to any extent. They aided largely in the downfall of the Federal party.

ALIMENTARY CANAL (ăl-ĭ-mĕn'tȧ-rȳ), the name of that portion of the digestive apparatus through which food passes after mastication. It includes the pharynx, aesophagus, stomach, and small and large intestines. These organs are lined with a mucous membrane, which possesses the function of absorbing certain substances and rejecting waste matter, and is modified in each region according to the function of the part. The length of the alimentary canal is five to six times the height of the individual, usually about thirty feet in the adult, measured from the base of the skull to the extreme end of the large intestines.

ALISON (ăl'ĭ-sŭn), **Sir Archibald**, historian, born at Kenley, England, Dec. 29, 1792; died near Glasgow, May 23, 1867. He was a son of Archibald Alison (1757-1839), a Scottish clergyman, and studied in the schools and University of Edinburgh. In 1814 he was admitted to the bar and for some time traveled in Europe, and in 1834 became sheriff of Lanarkshire. He published his first writing in 1832, entitled "Principles of the Criminal Law of Scotland," and soon after the "Practice of the

Criminal Law." His best known work, entitled "History of Europe from 1789 to 1815," begins with the French Revolution and ends with Napoleon's defeat at Waterloo, but was subsequently brought down to 1852. This work shows considerable research, but contains some inaccuracies occasioned by the partisanship of the author. Other writings embrace "Principles of Population," "Life of the Duke of Marlborough," and "Political and Historical Essays."

ALIZARIN (ȧ-lĭz′ȧ-rĭn), a coloring matter derived from the root of the madder. This plant is cultivated in Southern Europe for its coloring principles, but alizarin is now derived largely from anthracene, a hydrocarbon contained in the refuse of coal tar. From it the Turkish red dyes are obtained.

ALKALI (ăl′kȧ-lī), a term of Arabic origin, alki being the name of the plant from which an alkaline substance was first derived. The name is now applied to a class of substances that have similar properties, the most conspicuous being solubility in water, power of corroding vegetable and animal substances, ability to neutralize acids and with them to form salts, and the property of changing the tint of various coloring matter. Properly, there are four alkalies—soda, lithia, potash, and ammonia. The first three are oxides of metals; the last is called the volatile alkali, being in the form of gas, and compounded of nitrogen, oxygen, and hydrogen. Potash is called the vegetable alkali, being largely found in the ashes of plants, and soda is termed the mineral alkali, owing to its predominating in minerals. Alkalies have a soapy taste, form soap with fats, and act on the skin. They turn most vegetables green, turmeric brown, and reddened litmus blue. When united with an acid, the peculiar qualities of each are destroyed or neutralized, as is exemplified when mixing soda with sour milk; the former an alkali, and the latter an acid. The term *alkali* as employed in commerce usually implies caustic soda or potash, and both are used in the arts for the manufacture of glass, soap, and many other products. Caustic potash is used in surgery for cauterizing.

ALKALOID (ăl′kȧ-loid), a compound of vegetable origin, usually complex in composition, and found in living plants. All the alkaloids contain nitrogen and certain properties in common with ammonia, especially the power to form salts when combined with acids. Their properties, which are extracted from the plants by treating with dilute acids, are poisonous and medicinal. The list of alkaloids embraces quinine, cocaine, morphine, caffeine, strychnine, aconitine, narcotine, codeine, coniine, nicotine, theobromine, etc. Artificial alkaloids are derived from coal tar products.

ALLAH (ăl′lȧ), the Arabian name of God, whose attributes are thus summed up by the Koran: "There is no God but God. This only true, great, and most high God has his being through himself; is everlasting; is not begotten and begetteth not; is all-sufficient in himself; fills the universe with his infinity; is the center in which all things unite, as well the hidden as the manifest; is Lord of the world of bodies and spirits, creator and ruler, almighty, all-wise, all-loving, merciful; and his decrees are unchangeable." Allah Akbar, meaning God is great, is a popular war cry among the Mohammedans.

ALLAHABAD (äl-lä-hä-bäd′), an important city of India, capital of the Northwest Provinces, at the junction of the Ganges and Jumna rivers. It is strongly fortified, has extensive railroad facilities, and is regarded the holiest of all places by the Hindus. Those people make it one of their chief resorts, and thousands make pilgrimages to bathe at the junction of the two rivers. The Mohammedans also hold it sacred, and to them it is known as the "City of Allah." There are a number of fine government buildings, numerous mosques, temples, and educational institutions, and it is the seat of a famous annual industrial exposition. The manufactures include clothing, carpets, textiles, leather, pottery, and machinery. It was founded in the 3d century B. C., and has long ranked as an important trade and manufacturing center. Population, 177,210.

ALLAN (ăl′lan), **Sir Hugh,** financier, born at Saltcoats, Scotland, Sept. 29, 1810; died Dec. 8, 1882. He was first employed as a clerk, and in 1824 removed to Canada. In 1837 he took part in the Canadian rebellion and attained the rank of captain. He is one of the founders of the Allan line of ocean steamers, which became important in the commercial development of Canada. In 1871 he was knighted and became prominent in Canadian politics and in the development of railroad building. His ability as financier caused him to become one of the wealthiest men in the Dominion.

ALLAN, Sir William, painter, born in Edinburgh, Scotland, in 1782; died Feb. 22, 1850. He studied in the Royal Academy at London, traveled in Russia and Turkey, and gave special attention to historical painting. In 1838 he was elected president of the Royal Scottish Academy, and Queen Victoria knighted him. Among his best-known paintings and engravings are "Queen Mary Signing Her Abdication," "Waterloo," "John Knox Admonishing Queen Mary," and "A Slave Market at Constantinople."

ALLEGHANY (ăl-le-gā′nĭ), a name sometimes applied to the great mountain system in the eastern part of the United States, though it is more commonly known as Appalachian. The Alleghany mountains proper are the ranges of the Appalachian system that traverse the states of Virginia, Maryland, and Pennsylvania. They comprise a number of parallel chains that trend from the southwest to the northeast. Their average elevation is about 2,500 feet, reaching their highest summits in Virginia, where they are over 4,000 feet high. These mountain ranges are well wooded to the summit and throughout the region are many fertile valleys. Large quantities of iron, bituminous and anthracite coal, limestone, and other minerals and quarry products are obtained.

ALLEGHANY SPRING, a village and post office of Virginia, in Montgomery County, 80 miles west of Lynchburg, near the line of the Norfolk and Western Railroad. It is noted for the large number of highly saline springs that are located in the surrounding country. The vicinity is known as Alleghany Springs and is much frequented as a summer resort. Shawsville, three miles distant, is the railroad station.

ALLEGHENY, a river of the United States, rises in Potter County, Pennsylvania, and unites with the Monongahela at Pittsburg to form the Ohio. It courses through a fertile valley, is about 365 miles long, and is navigable some distance above Pittsburg.

ALLEGHENY, formerly a city of Pennsylvania, in Allegheny County, opposite Pittsburg, but united with the city of Pittsburg since 1906. It is finely situated on the Allegheny River, is the focus of a network of railroads, and ranks as a favorite residence place for Pittsburg business men. A large number of bridges cross the Allegheny River, both for pedestrians and commercial traffic, and it has extensive electric railway facilities with many points within the State. It is important as a center for the manufacture of ironware, boilers, brick and tile, salt, locomotives, machinery, clothing, stoves, white lead, and leather. There are extensive municipal improvements, including waterworks, pavements, gas and electric lighting, and sewerage. Among the chief buildings are extensive grain elevators and storehouses, the Allegheny Observatory, the Western Theological Seminary, and numerous libraries, schools, hospitals, and churches. Allegheny was first settled in 1788, and its incorporation as a city dates from 1840. Population, 1900, 129,896. See **Pittsburg.**

ALLEGIANCE (ăl-lē'jans), the term used to express that duty which a citizen owes to the State to which he belongs, or the tie or obligation to one's country. The English doctrine which asserted that allegiance is indelible was early adopted by the United States, but this theory has since been modified by the enactment of naturalization laws.

ALLEGORY (ăl'lē-gȏ-rȳ), a narrative or discourse in which the principal subject is described in a manner that really refers to another, which resembles it in many important characteristics. In a complete allegory, the characters or leading circumstances refer to some underlying thought. This is the case in Bunyan's "Pilgrim's Progress," in which is described a journey from the City of Destruction to the Celestial City by the faithful Christian. Chaucer's "House of Fame" and Tennyson's "Idylls of the King" are other examples of English allegories.

ALLEN, Charles Herbert, public man, born at Lowell, Mass., April 15, 1848. He attended the public schools and graduated at Amherst College in 1869, and engaged in the lumber business at Lowell. In the meantime he took an interest in local politics, served in the lower house of the Legislature in 1881-82, and the following year was a member of the State senate of Massachusetts. He was a member of Congress two terms, from 1885 to 1889, and in 1898 was made Assistant Secretary of the Navy, in which office he succeeded Theodore Roosevelt. In 1900 he was appointed first Civil Governor of Porto Rico, in which position he did much to promote the trade and the internal improvements of the island.

ALLEN, Ethan, soldier and patriot, born in Litchfield, Conn., in 1737; died in Burlington, Vt., Feb. 13, 1789. In 1765 he settled in what was then known as *New Hampshire Grants,* and now forming Vermont. This region was claimed by New Hampshire and New York, and, to protect their interests, the settlers organized a company under the name of Green Mountain Boys and chose Allen as leader. This company, aided by the New Hampshire grantees, expelled the New York settlers. In 1775, after the Battle of Lexington, he marched with his company against Ticonderoga and Crown Point. At the break of day on May 10 he surprised Ticonderoga. Having secured entrance to the fort with eighty-four men, he awoke the sleeping garrison with a shout of victory and demanded of Captain Delaplace, the British commander, an unconditional surrender "in the name of the Great Jehovah and the Continental Congress." The fort yielded, surrendering with 120 cannon, many small arms, and large quantities of ammunition and supply stores. For this excellent service he received a vote of thanks from Congress. In September of the same year, while on an expedition to Montreal, he was taken prisoner by the British and sent to England. After Burgoyne's surrender at Saratoga, he was released by exchange for a British colonel, and was appointed major general of the Vermont militia, in which capacity he rendered valuable services. After the close of the Revolution, in 1784, Allen wrote a book, entitled "Reason the Only Oracle of Man," the first of the works against Christianity published in America.

ALLEN, James Lane, author, born near Lexington, Ky., in 1849; died Feb. 18, 1925. He was carefully educated and taught in Kentucky University, and afterward was an instructor at Bethany College, W. Va. After 1886 he devoted his time entirely to literature. His works are numerous and consist chiefly of novels. Among his books are "John Gray: A Novel," "A Night in Arcady," "The Reign of Law," "The Choir Invisible," "The Kentucky Cardinal," and "The Mettle of the Pastor."

ALLEN, Jeremiah M., business man, born in Enfield, Conn., May 18, 1833; died Dec. 29, 1904. He descended from Samuel Allen, of Revolutionary fame, and became widely known as president of the Hartford Steam Boiler Inspection and Insurance Company, which office he held thirty-three years. He founded the *Locomotive,* an engineering magazine.

ALLEN, William, statesman, born in Edentown, N. C., in 1806; died July 11, 1879. He studied at Chillicothe Academy, Ohio, and in 1827 was admitted to the bar. His eminent ability as a lawyer gave him a lucrative practice. He was elected to Congress in 1832, where he was the youngest member of the House, and in 1837 he became a member of the Senate, where he was also the youngest member, and was reëlected in 1843. In 1848 he refused the nomination for President on the Democratic ticket, since his support had been pledged to Lewis Cass. He became Governor of Ohio in 1873, but was defeated for reëlection by R. B. Hayes.

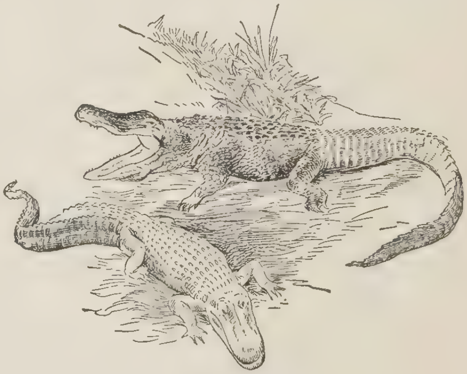
ALLENBY, Sir Edmund Henry Hynmon, soldier, born in England, April 23, 1861. He studied at Haileybury, served in the campaigns of South Africa, and commanded on the Somme and the Aisne in France. In 1917 he had charge of the expedition in Palestine, where he defeated the Turks and captured Jerusalem. His skillful generalship contributed to many British successes.

ALLENTOWN (ăl'ĕn-town), a city in Pennsylvania, county seat of Lehigh county, on the Lehigh River. In its vicinity are extensive coal and iron ore mines and factories producing brick and tile. The city has convenient railroad facilities, being on the Central of New Jersey, the Lehigh Valley, and other railways. It is an important market for farm and dairy products, and has extensive manufacturing and commercial interests. The chief manufactures include leather, boots and shoes, machinery, boilers, hardware, furniture, and clothing. It is the seat of Muhlenberg College and of Allentown Female College, and has excellent public schools, numerous churches, and a fine county courthouse. Gas and electric lights, pavements, street railways, several libraries, and a number of parks are among the conveniences. William Allen, then the chief justice of Pennsylvania, after whom it was named, platted the town in 1752. It was incorporated as Northampton in 1811, but its original name was restored in 1838. Population, 1900, 35,416; in 1920, 73,502.

ALLIANCE (ăl-lī'ans), a city of Stark County, Ohio, on the Mahoning River, fifty-seven miles south of Cleveland. The city has transportation facilties by the Pennsylvania, the New York Central, and other railways. It is surrounded by a rich agricultural country, which produces cereals, dairy products, fruit, coal, and mineral oil. Among the manufactures are steel products, automobile accessories, pottery, machinery, and clothing. Gas and electric lights, pavements, street railways, public parks, and extensive railroad facilities are among the conveniences. The city has fine public schools and churches, and near it is Mount Union College. Population, 1900, 8,974; in 1920, 21,603.

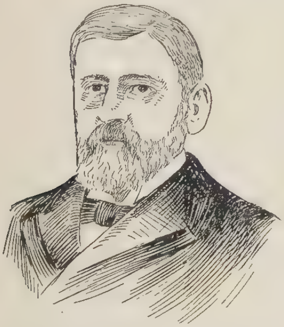
ALLIBONE (ăl'lĭ-bōn), **Samuel Austin,** author, born in Philadelphia, Pa., April 17, 1816; died Sept. 2, 1889. He first entered upon a mercantile career, but soon began to compile his "Critical Dictionary of English Literature and British and American Authors." In this publication he attempted to give the title of every book published in the English language, including quotations from critical writers and biographical sketches of the authors. The work comprises notices of 46,599 writers and represents about 20 years of hard work by the author. He was for several years secretary of the American Sunday School Union and compiled "Poetical Quotations from Chaucer to Tennyson," "Prose Quotations from Socrates to Macauley," "Indexes to Edward Everett's Orations and Speeches," and "Explanatory Questions on the Gospels and the Acts."

ALLIGATOR (ăl'lĭ-gā-tẽr), a large carnivorous reptile peculiar to America, and found mostly in the swamps and streams of the warmer regions. It is closely allied to the crocodile family, with which it is classed, but has a broader head, larger number of teeth, and feet less webbed, and its habits are less aquatic. Alligators are often seen in groups by day basking on the dry ground in the warm sun, but at night they become active and noisy. They burrow in the mud of swamps in the winter, where they lie torpid until the return of warm weather. The chief food of both alligators and crocodiles is fish, but they also devour small animals and carrion, and when pressed by hunger show considerable determination in attacking man. Some writers assert that the alligators possess a musky fluid secreted by the


ALLIGATORS.

glands of the throat, which they throw out as a sort of bait to attract the fish on which they prey. The female lays a large number of eggs, ranging from forty to two hundred, which she buries in the sand or in heaps of vegetable matter to be hatched by the warm sun. At fifteen years the alligator is not more than two feet long, and it requires from sixty to ninety years to develop the full growth of the adult. The skin on the back of mature alligators is so hardened by horny scales that a large rifle ball is required to inflict a fatal wound. These plates form two upright denticulated crests, which gradually converge toward the middle of the tail, and there unite and form a single row to the extremity. The skin of alligators is used in the manufacture of boots and shoes. A full-grown alligator is very large, attaining a length of eighteen to twenty feet, and its body is about eight times longer than the head. The flesh is sometimes eaten, though mostly by savages. A species known as *spectacled cayman* is native to South America.

ALLIGATOR LIZARD, a class of reptiles common to Mexico and the southwestern part of the United States. These animals are active and are frequently seen on the sides of stone walls and adobe houses, and in forests hide near fallen trees or ascend to the branches of standing trees to escape from intruders. They are characterized by flat scales and the absence of spines, and when the head is raised the brilliant colors of the throat become visible. They multiply rapidly, laying their eggs in the sand to be hatched by the sun.



WILLIAM BOYD ALLISON.

ALLISON (ăl'li-son), **William Boyd,** statesman, born in Perry, Ohio, March 2, 1829; died Aug. 4, 1908. He studied at the Western Reserve Academy, Ohio, was admitted to the bar, and in 1857 removed to Iowa. At the beginning of the Civil War he became a member of the Governor's staff and aided in organizing the Iowa volunteers. In 1862 he was elected to Congress, serving four terms in the House of Representatives, and in 1873 was chosen United States Senator to succeed James Harlan. As a legislator he attained much influence, serving on many important commissions and committees, and was reëlected five times consecutively. In 1892 he served as a delegate for the United States to the International Monetary Conference. Senator Allison ranks among the most prominent statesmen of America, and was frequently mentioned as a Republican candidate for President. His service of four terms in the House and six in the Senate, a total of 44 years, is the longest any one has been a member of Congress.

ALLITERATION (ăl-lĭt-ẽr-ā'shŭn), the repetition of the same letter at the beginning of two or more words immediately succeeding each other, or at short intervals. It was used extensively in the Middle Ages, and in old German and Scandinavian poetry it took the place of rhyme. Spenser employed this style of writing extensively, and uses of it are made in the works of Pope and Gray. Tennyson employed illiteration combined with the distribution of vowels and in this practice was joined by many poets, but prose writers usually avoid it. "The fair breeze blew, the white foam flew" and "Many men of many minds" are examples of alliteration.

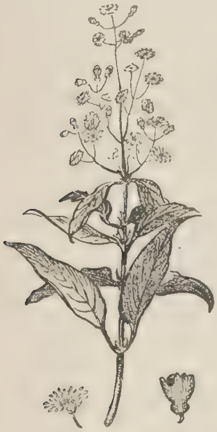
ALLOPATHY (ăl-lŏp'ȧ-thy̆), the term originated by Hahnemann (q. v.) to distinguish the ordinary practice of medicine from homeopathy. It was founded on the theory expressed by Hippocrates that "opposites are remedies for opposites." However, the term is gradually going out of use, since practitioners cannot confine themselves to such limitations in the treatment of diseases. In the development of new branches of science, as, for instance, bacteriology, new resources have become prominent and have been extensively developed.

ALLOY (ăl-loi'), a name given by the French to a compound or combination of two or more metals fused together. It is now applied to any mixture of metals, excepting cases in which mercury is one of the metals, when the compounds are called amalgams. Most metals mix in any proportion, but some form true mechanical compounds by uniting only in definite proportions, while others resist homogeneous combination and form a conglomerate of distinct masses. A very great variety of changes are produced by the combination of metals. An alloy may differ in color from either of the components, or may be very similar to one of them. While an alloy is generally harder than its components, it usually constitutes a body less malleable and ductile. Its specific gravity is sometimes less than the average of that of its ingredients, while it is always more fusible. Bronze, brass, pewter, and type metals are alloys. The silver money of the United States is made up of nine parts of silver and one part of copper; the gold coins contain nine parts of gold, and the other part is one-fourth silver and three-fourths copper. The reason other metals are mixed with gold and silver is that they are too soft for money unless hardened by mixing with other metals. Some of the valuable bronze alloys compounded in recent years contain aluminum. In electrotyping, alloys are made by using thirteen parts tin with aluminum to form a nonshrinking combination. Arsenic adds strength to copper, while other chemicals increase the brightness of gold. Besides these, there are many other useful combinations.

ALL SAINTS' DAY, or **Allhallows,** a Christian festival instituted in 835, and celebrated in honor of the saints in general. This festival is observed by the Anglican, Lutheran, and Roman Catholic Churches on November 1, and by the Greek Church on the Sunday after Whit Sunday. It was introduced because a separate day could not be set apart for every saint.

ALL SOULS' DAY, a festival observed on November 2 by the Roman Catholic Church. It was instituted in 998 as a day for prayers offered publicly at the Eucharist for the faithful departed who have not attained to perfect life.

ALLSPICE (ạl′spīs), or **Jamaica Pepper,** a tree-like plant of the West Indies, whose fruit combines the flavors of cinnamon, nutmeg, and cloves. The fruit is used extensively in medicine and cookery and in the manufacture of an essential oil and other products. It also serves as an aromatic, and forms the basic ingredient of distilled water. The tree is of an ornamental character, usually twenty to thirty feet in height, with oval leaves and small flowers. A single tree produces about 100 pounds of the dried spice.



ALLSPICE.

ALLSTON (awl′ston), **Washington,** painter, born in Waccamaw, S. C., Nov. 5, 1779; died in Cambridge, Mass., July 9, 1843. He graduated from Harvard College, and afterward studied in London, Paris, and Rome. While in Europe, he formed the friendship of Benjamin West, Coleridge, and Thorwaldsen. Many of his paintings are founded on subjects taken from sacred history, and all display high imaginative power and a rare mastery of color. He has been surpassed by no American painter in the delineation of sacred history. His chief productions include "Dead Man Revived by Touching the Bones of Elijah," "Uriel in the Sun," and "Belshazzar's Feast."

ALLUVIUM (ăl-lū′vĭ-ŭm), the deposits of soil by the action of water, consisting chiefly of clay, loam, marl, and sand. The term is used in reference to transported matter by the action of fresh water, which was deposited both during the Pleistocene and recent periods. When used in the former sense, it includes deposits formed on large bases in all geological ages, but in the latter sense it is confined more strictly to the action of oceanic waves, deposits of rivers as seen in deltas, and washes from hill sides, caused by recent rains. Lands made in this way are said to be alluvial in their origin. This action is going on constantly by various agencies. It is exemplified by the Ganges, Nile, Volga, Mississippi, and other rivers, particularly at their mouths, where the silt is deposited and forms deltas of considerable extent. An estimate recently made places the silt carried annually by the Mississippi at a volume sufficient to cover 275 square miles of land with a layer one foot deep.

ALMA (äl′mȧ), a small river in the Crimea, coursing in a westerly direction to Kalamita Bay, near Sebastopol. Prince Mentschikoff, the Russian commander, selected the southern bank of this river as a defensive position in the Crimean War, where he was attacked by the allied army Sept. 20, 1854. The Russian army of 35,000 men was defeated by the allies numbering 62,000, and as a result of the battle the road to Sebastopol was opened.

ALMAGRO (äl-mä′gro), **Diego de,** explorer, born in Almagro, Spain, about 1464; died in 1538. His parentage is unknown, and he was so named from the place of his birth, where he was raised as a foundling. He came to America at an early age, and, after acquiring considerable wealth, joined Pizarro at Panama in an attempt to conquer Peru from the Incas. Though he never learned to read and write, he showed remarkable ability as a manager of supplies, and in 1535 undertook to seize Cuzco, the capital of Peru, and afterward invaded Chile. Subsequently he was recalled to suppress a rising of the Peruvians, whom he defeated, but became entangled in a quarrel with Pizarro. The latter caused him to be taken and executed.

ALMANAC (ạl′mȧ-năk), a small book primarily designed to furnish a calendar or table of the days belonging to the several months of the year for which it is published. Besides serving as a guide to designate the days of the month, calendars usually contain data of the rising and setting of the sun and moon, the phases of the moon, the position of the heavenly bodies, important dates observed by the church and state, and much other information of use to the public. The term is of Arabic origin, but it is known that an almanac was published at Alexandria by the Greeks about the 2d century A. D. Almanacs were first published in Europe by Solomon Jarchus in 1150, and subsequently came into extensive use. Benjamin Franklin began the publication of an almanac in 1732, pretending it was written by one Richard Saunders, and his publication came to be called "Poor Richard's Almanac." Besides the monthly calendar and movements of the heavenly bodies, his almanac contained anecdotes, scraps of useful information, and odds and ends of literature, and was published annually for twenty-five years. In more recent times almanacs came to be published in connection with advertisements of large manufacturing and publishing companies, and many are now distributed free of charge to the public. Some of the great daily newspapers of the United States and Canada publish annually almanacs in which valuable information is detailed, many of these publications embracing 500 to 800 printed pages. A publication known as "The Nautical Almanac" is published annually by the United States Bureau of Navigation, and serves the purpose of a guide for navigators. By means of it any locality on mid ocean can be determined by the sailor. The computations are made for three years, and the publications serve for that period of time. Similar almanacs are published by the governments of France, Germany, and Great Britain.

ALMA-TADEMA (ȧl-mȧ-tăd'ē-mȧ), **Lawrence,** eminent artist, born in Dronryp, Holland, Jan. 8, 1836. He descended from an ancient family, studied at the Academy of Antwerp, and in 1873 settled in England. Most of his productions relate to classical subjects, and show excellent taste in design and coloring. Among his most important paintings are "Way to the Temple," "At the Close of a Joyful Day," "Entrance to a Roman Theater," and "Dedication to Bacchus." He died June 24, 1912.

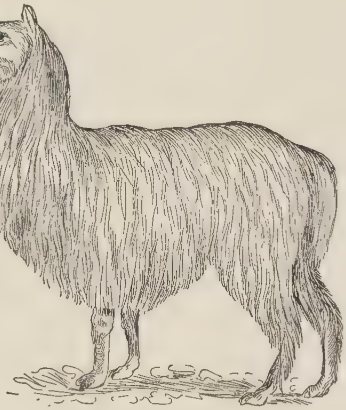
ALMERIA (äl-må-rī'ȧ), a seaport of Spain, in a province of the same name, 60 miles southeast of Granada. It is located at the head of Almeria Bay, an inlet from the Mediterranean, and the country adjacent is devoted to the culture of fruits and cereals. The manufactures include macaroni, sugar, white lead, and clothing, and there is a considerable trade in iron ore, fruit, and wine. It is the seat of a bishop, a Gothic cathedral, and several nunneries. The Church of San Pedro, a fine edifice, occupies the site of a Moorish mosque. Almeria was founded by the Phoenicians and by the Romans was called Magnus Pontus. Population, 1920, 45,198.

ALMOND (ä'mŭnd), the fruit of the almond tree, which is native to Africa and Asia, but has been naturalized in America and Europe. There are two varieties, the bitter and the sweet. The sweet almond is an article of food, and when taken in moderate quantities is quite nutritive. Almond oil is obtained from the kernel of either the bitter or the sweet species, and is alike valuable for medicine and as a perfume. Prussic acid is obtained from the bitter almond.

ALOE (ăl'ō), the name of a number of plants belonging to the order of lilyworts, some of which are not more than a few inches high, while others attain a height of thirty feet. The different species include herbs, shrubs, and trees, and are characterized by erect spikes or clusters of flowers. In the West Indies they serve as hedges. The juice is purgative in large doses and laxative in small quantities, and the fibers yield a product useful in making coarse cloth and cordage. See **Agave.**

ALOES WOOD, or **Eagle Wood,** the inner part of the trunk of trees native to the tropical parts of Asia. These trees are supposed to be the *lign aloes* mentioned in the Bible. They yield a fragrant resinous substance, which has a pleasant odor when burned, and is highly prized as a medicine by Asiatic people. Several species of this class of trees are found, some of which yield wood that takes a high polish and is used for ornamental work. The younger wood is white and almost devoid of scent, while the older growth has a dark color and yields the most fragrant resinous substances.

ALPACA (ăl-păk'ȧ), an animal native to the mountain regions of Peru and Chile, where it subsists on the coarse and scanty forage growing on the sterile soil. It is shaped much like a sheep, but is larger, and its color varies from grayish white to almost black. The wool is soft and silky, usually light chestnut brown, nearly a foot long, and is strong and almost as fine as that of the Cashmere goat. Thin cloth called alpaca is made from alpaca wool mixed with cotton or silk. It is an important article of commerce, and is used largely for shawls, light clothing, and umbrellas. The alpaca is a mammal of the cud chewing class, and is classed with the same family as the camel. Its flesh is pleasant and wholesome.



ALPACA

ALPENA (ăl-pē'na), a city of Michigan, county seat of Alpena county, on the shore of Lake Huron, at the head of Thunder Bay, on the Detroit and Mackinaw Railway. It has an excellent harbor and enjoys considerable trade advantages. It is the seat of a United States fish hatchery, and has a fine public school system, numerous churches, and several libraries. There are manufactures of furniture, machinery, cigars, canned fruit, and clothing. Electric lights, bathing beaches, waterworks, sewerage, and several parks are among the conveniences. It has an extensive export trade in lumber. The first settlement in its vicinity was made in 1835, and it was incorporated in 1871. Population, 1904, 12,400; in 1920, 11,101.

ALPHA AND OMEGA (ăl′fȧ ō-mē′gȧ), the first and last letters of the Greek alphabet, used as a symbol to denote the Divine Being, and often made to signify the beginning and the end, or the first and the last of anything. The term is also used to signify the chief aim, as: "Ambition was the Alpha and Omega of his existence."

ALPHABET (ăl-fȧ′bĕt), a list of symbols that represent to the eye the sounds heard in speech. The name originated from the first two letters of the Greek alphabet—alpha and beta. The alphabets of the different languages show marks of wide differences. In the English alphabet and many others are characters to represent both vowels and consonants, but the Hebrew alphabet contains letters only for the consonants, the vowels being distinguished by slight changes in some of the consonant letters. The alphabet of the Cherokee Indians and a number of others represents each syllable by a letter, while the Chinese have no alphabet as that term is understood, but instead use a sign or character for every word in their language. The English alphabet, like most of those of modern Europe, is of Latin derivation, the Latin in turn came from the ancient Greek, and that again from the Phoenician. The Phoenician alphabet is believed to have originated, like the Hebrew, from Egyptian hieroglyphics.

Most of the European alphabets agree in many respects, but some do not represent all the English sounds and do not contain all the letters. The Russian language has many sounds not common to other languages and contains thirty-six letters. The French have not the w; the Portuguese no k and w, and the Italian no k, w, x, and y. In the German alphabet are all the letters common to the English, but they differ somewhat in sound and in the number of sounds represented by the vowels. The English alphabet is both defective and redundant, and is a very imperfect instrument to serve the purpose for which it is intended. Its imperfection is at least partly due to a want of characters to represent all the simple sounds, and in having more than one symbol for the same sound. However, since sounds change as well as grammatical forms, it may never become possible to secure a perfect alphabet in any language.

ALPHONSO. See **Alfonso.**

ALPS (ălps), the most extensive system of mountains in Europe, covering a region of 90,000 square miles, which lies chiefly in Italy, France, Germany, Austria, and Switzerland. The average height is about 7,700 feet, and many of the summits extend far above the snow line, and are covered with perpetual snow and ice. Mont Blanc, 15,781 feet, and Mont Rosa, 15,217 feet, are the culminating peaks, but several others rise almost as high. The system of ranges is grouped as Eastern, Western, and Central Alps. They occupy the form of a semicircle, with the Apennines, Balkans, Vosges, Hartz, and Carpathians extending out from the principal chain. On the north is the great glacier called Mer de Glace, which is five miles wide, fifteen miles long, and 100 feet thick. Other glaciers abound in different parts of this region of snow-capped peaks, from which great masses of snow and broken ice move into the valleys, bearing with them rocks and trees, and destroying many objects in their way. Forests and villages have often been buried beneath the avalanches of snow and ice, and when melted they have caused great floods in the valleys. There are now many roads leading over the Alps, some passable for carriages, and others only for travelers on foot. A number of these highways were built by Napoleon to convey his army and supplies over the Alps to the country beyond.

In ancient times it was thought a great feat to cross the Alps, the most successful exploit of the kind being achieved by Hannibal at the passage of the Little Saint Bernard in the year 218 B.C., when he set out from New Carthage to invade Italy. The Duke of Alva led 10,000 men over Mont Cenis in 1567, and in 1800 Napoleon crossed from Switzerland into Italy with 30,000 men. All the mountains being barren and covered with snow, it was thought a remarkable piece of military skill to take an army with horses, cannon, ammunition, and supplies safely over dangerous precipices and land them securely on the other side. In recent times railroads have been constructed over two mountains, and two great tunnels have been built for other railways. Saint Gothard Tunnel, leading from Switzerland to Italy, is the largest railroad tunnel in the world, being nine and one-half miles long. Next to it is Mont Cenis Tunnel, which is nearly eight miles in length. Vegetation in the Alps is varied, owing to the great altitude, and there are valuable deposits of iron, manganese, marble, and many other minerals. With the ascent of every thousand feet is a marked difference of temperature, until the region of perpetual snow shuts out all signs of plant life. The chamois and the mountain goat are animals peculiar to the Alps.

ALSACE-LORRAINE (äl-säs′lō-rān′), a region in the eastern part of France, situated north of Switzerland and west of Germany, and including an area of 5,668 square miles. The region lies largely in the valley of the Upper Rhine, is traversed by a network of railroads, and its inhabitants engage largely in agriculture, fruit growing, and manufacturing. It was a part of the kingdom of Lothaire in the 9th century. When his dominions were partitioned between France and Germany in 969, it became an object of contention between these two powers, and has since been a source of dispute at various times. The region was the scene of several decisive battles in the Franco-German War of 1870-71. Strasburg and other fortified cities were besieged and captured by the German army. At the peace negotiations, Germany demanded the cession of Alsace together with what is called German Lorraine, this being one of the early conditions of peace laid down by Count Bismarck, and was accepted by M. Thiers, and afterward ratified by the national assembly at Bordeaux. The language spoken in German. Attendance at free schools is compulsory. Strasburg, on the Ill River, near the Rhine, is the capital and largest city. The French invaded Alsace-Lorraine, near Altkirch, in 1914, and in 1919 it was given to France by the Paris Peace Congress. Pop., 1919, 1,895,765.

ALTAI MOUNTAINS (äl-tī'), an important range of mountains in Asia, forming a part of the boundary between China and Siberia. Among the great rivers having their sources in these mountains are the Obi, Irtish, Yenisei, and Amur. The different chains lie partly in Russian and partly in Chinese territory. Byeluka is the highest peak, elevation 11,000 feet. A celebrated trade route from Pekin to Saint Petersburg crosses these mountains some distance southwest of Lake Baikal, but it is not used as extensively as formerly, owing to the construction of the Trans-Siberian Railway. The Altai Mountains are rich in minerals, including iron, copper, silver, gold, and petroleum. Many of the people inhabiting the mountain region are Russians. Barnaul is the chief city.

ALTAMAHA (a̤l-tȧ-mȧ-ha̤'), a river in Georgia, formed by the confluence of the Oconee and Ocmulgee rivers. Its general course is southeast through a sandy plain, and it flows into Altamaha Sound, an inlet from the Atlantic. The Ohoopee is its principal tributary. Darien, a thriving commercial town, is about 12 miles above its entrance into the sea.

ALTAR (a̤l'tur), an elevated place of worship in Christian churches. Altars are constructed of wood, stone, or marble, though they are of great variety in shape and structure. Most of the Protestant churches have not retained the altar, but generally apply the same name to the table-like structure on which communion is offered. The altar is still used in some of the Lutheran churches, and both the Roman and Greek churches contain altars. Pope Sixtus II. erected the first stone altar, and it is thought that Saint Wolstand introduced stone altars in England. The ancient Greeks and Romans had a number of altars in their places of worship, each dedicated to some particular diety, and sacrifices and blood offerings were made on altars in many countries, especially among the heathen. In some nations the altar was looked upon as a refuge in the time of danger. The Jews regard the altar a sanctuary.

ALTENBURG (äl'ten-bo͝org), a city in Germany, capital of Saxe-Altenburg, near the Pleisse River, about 24 miles south of Leipzig. It is the seat of several educational institutions and has a fine art gallery, a museum, and a hospital for the poor. Several railroads and manufactures of woolen goods, toys, cigars, and clothing make it important as a commercial center. Population, 1920, 40,235.

ALTGELD (ält'geld), **John Peter,** public man, born in Germany, Dec. 30, 1847; died March 20, 1902. He came to Ohio in 1849, where he attended the public schools, and in 1864 enlisted for service in the Union army. In 1886 he was elected judge of the superior court of Cook county, Illinois, and in 1892 became Governor of the State, serving four years. While in that position he attracted national attention on account of his severe criticism of President Cleveland for sending troops to Chicago at the time of the great railroad strike. In 1896 he supported the following plank, which was inserted in the platform adopted by the national Democratic convention at Chicago: "We denounce arbitrary interference by Federal authorities in local affairs as a violation of the Constitution of the United States, and a crime against free institutions, and we especially object to government by injunction as a new and highly dangerous form of oppression, by which Federal judges, in contempt of the laws of the State and rights of citizens, become at once legislators, judges, and executioners."

ALTO (ăl'tō), a term used in designating voice, or pitch of sound. The term is applied to the lowest female voice, having a compass of about an octave and a half, and the term contralto signifies a tone quite similar, being the voice between the tenor and soprano. The term alto was formerly applied to the highest male voice.

ALTON (a̤l'tun), a city of Illinois, in Madison county, on the Mississippi River, twenty-one miles above Saint Louis. The city occupies a fine site about 200 feet above the river, and is on the Chicago and Alton, the Chicago, Burlington and Quincy, and other railways. It is a port city of entry, has extensive steamboat connections, and is an important trade center. Among the manufactures are quarry products, machinery, furniture, tobacco products, clothing, and earthenware. The streets are substantially paved with brick and asphalt. It has systems of electric lights and waterworks, a park, several libraries, and an extensive system of street railways. The city has excellent schools and churches, and is connected by electric railroad with Upper Alton, the seat of Shurtleff College, a Baptist institution founded in 1827. The census of 1910 accords Upper Alton a population of 2,918, while Alton in 1920 had a population of 24,714.

ALTONA (äl'tō-nä), an important city of Germany, in the province of Schleswig-Holstein, on the Elbe River, and connected by railroads and electric car lines with Hamburg. It has excellent public schools, an observatory, an infirmary, a mint, several colleges, and many libraries. Among the chief buildings are the palace of justice, the city theater, the customhouse, and several cathedrals and other churches. The manufactures include tobacco, sugar, soap, cordage, silk and cotton textiles, chemicals, and leather. It has an excellent harbor, modern municipal improvements, and a large domestic and foreign trade. The city was founded by the Danes as a rival to Hamburg, but in 1867 came into possession of Prussia. Population, 1905, 168,320; in 1920, 172,533.

ALTOONA (ăl-tōō′na), a flourishing city of Pennsylvania, in Blair county, near the Alleghany Mountains, on the Pennsylvania Railroad. It is an extensive commercial and manufacturing center, and produces locomotives, railroad cars, ironware, textiles, clay products, motor cars, and machinery. About 16,900 persons are employed in the factories. The city has a fine public library, municipal waterworks, electric street railways, and pavements of stone and macadam. Lakemont Park is a fine public resort, and near the city is the famous Horseshoe Bend. The Pennsylvania Railroad Company founded Altoona in 1850. Population, 1900, 38,973; in 1920, 60,331.

ALTORF (ält′ôrf), or **Altdorf,** a city in Switzerland, capital of the canton of Uri, near the southern extremity of Lake Lucerne. It is nicely located at the foot of the Grünberg. Altorf is located on the railroad that passes through Saint Gotthard Tunnel, about 20 miles south. Population 1922, 2,980.

ALTRUISM (ăl′trōō-ĭzm), a word coined by M. Comte and adopted with decided approval by Herbert Spencer. It is used to express that theoretical condition of human principle which the benevolent aim to attain in relation with their fellows. In popular use the term implies the finding of one's own highest welfare in seeking the welfare of others.

ALTUS, county seat of Jackson County, Oklahoma, on the Saint Louis and San Francisco and other railroads. It has cotton mills, ice plant, public library, court house, high school, and street paving. The place was settled about 1902. Population, 1920, 4,498.

ALUM (ăl′ŭm), a whitish astringent saline substance used in the arts and in medicine. Its constituents are alumina, alkali, sulphuric acid, and water. There are three general classes of alum, these depending on whether the alkali contained is potash, ammonia, or soda. Though found in a natural state, the alum of commerce is manufactured. In a natural state it is obtained from alum ore, which occurs in the lower coal measures. It was known and manufactured fully six centuries ago in Syria and other parts of Eurasia. Burnt alum is what remains after the water is taken out by heat, and in this form is used as a caustic.

ALUMINIUM (ăl-ū-mĭn′ĭ-ŭm), or **Aluminum,** a ductile, malleable, sonorous metal of a whitish color. Though the most abundant of all the metals, it was not discovered until in 1827. It is found in slate, clay, mica, spar, and many other mineral substances, and until recently was not extensively manufactured owing to a lack of machinery with which to make its production sufficiently inexpensive. Electricity is employed largely in its manufacture from clay, since the process requires a very fierce heat, and the currents generated in some factories attain as high as 15,000 amperes and 30,000 volts. It can be drawn easily into fine wire, and may be converted into very thin foil by a process of rolling. In manufacture it is used with other metals for ornaments, scientific instruments, bells, and guns, and is mixed with different metals, such as copper, to serve very useful and ornamental purposes. Within recent years it has gone largely into the construction of kettles, scientific instruments, chains used in mining, bath tubs, and automobiles. In large factories it has been successfully alloyed with steel in manufacturing war vessels, and a class of torpedo boats are constructed largely of it. Since it is the lightest in weight of all metals and yet exceedingly durable, it can be seen why its use is constantly increasing.

ALUMNUS (ȧ-lŭm′nŭs), plural Alumni, a term used to designate a person graduated at a school, university, or other place of learning. Thus, an alumnus of a particular school implies one who completed a course of study there by graduation.

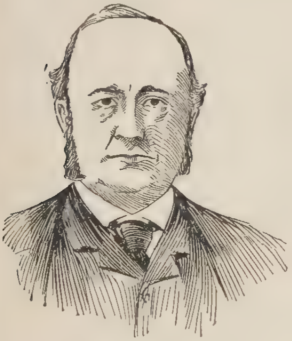
ALUM SHALE (ăl′ŭm shāle), or **Alum Stone,** a mineral consisting of clay combined with iron pyrites and mixed slightly with carbon or bitumin. This mineral is weathered by exposure to the air and rain, causing a dissolution of the pyrites and a union of the alumina with the sulphur, yielding a compound from which limonite and alum are obtained. In practice the shale is crushed before being exposed to the weather, or by burning slowly and leaching it.

ALVA (äl′vȧ), **Fernando Alvarez,** general and statesman, born in Spain in 1508; died Jan. 12, 1582. He descended from a family claiming descent from the Byzantine emperors, received an extensive military education early in life, and engaged in a battle at the age of sixteen years. Charles V. of Spain engaged him for his campaigns in Italy, France, Hungary, Germany, and Africa. Later he was commissioned by Philip II. to reduce the Netherlands to Spanish subjection, and, being refused passage through French territory, he sailed from Cartagena with a force of 10,000 picked veterans. His great cruelty and inhuman warfare caused thousands of merchants and noblemen to seek safety in Germany and England. Subsequently Holland and Zealand revolted and gained their independence, and he was dispatched to Portugal, which he made subject to

Spain in 1580. Alva ranks as one of the most cruel and vicious tyrants of the 16th century. He boasted that he had never been surprised or defeated in battle, and that he had sent to execution 18,000 men.

ALVARADO (äl-vȧ-rä'-thŏ), **Pedro de,** a conqueror of Spanish America, born at Badajoz, Spain, near the close of the 15th century; died in 1541. He sailed with four brothers for Cuba in 1518, and the following year became associated with Cortez, at a time when that famous general commanded an expedition to conquer Mexico. Charles V. made him governor of Guatemala, which he had conquered in 1523, and subsequently he conquered Honduras and added other regions to Spain. His death occurred from his horse falling upon him while attempting to escape from the Indians after a defeat in battle.

ALVERSTONE (ăl'vẽr-stôn), **Lord, Sir Richard Everard Webster,** eminent British jurist, born Dec. 22, 1842. He studied at King's College School and Trinity College, Cambridge, and was admitted to the bar in 1868. In 1885 he was elected a member of Parliament from Launceston, was attorney general of the United Kingdom until 1900, when he became lord chief justice of England. He was British counsel in the Venezuela dispute and in 1903 was president of the Alaska boundary commission, and in the latter position voted against the Canadian claims. He died Dec. 12, 1915. See **Alaska.**



LORD ALVERSTONE.

AMADEUS (ăm-ȧ-dē'ŭs), the name of several rulers of Savoy, the first being the eldest son of Count Humbert, who was born at the beginning of the 11th century. Amadeus V., count of Savoy, was born in 1249; died at Avignon in 1323. He is distinguished mainly on account of repulsing the Turks from Rhodes, which was then in the possession of the Knights of Saint John. Amadeus VIII., count of Savoy, succeeded his father, Amadeus VII., in 1391. During his government the territory of Savoy was erected into a duchy, but he retired from the government in 1434 and entered a monastery in Ripaille. He succeeded Pope Nicholas V., his papal title being Felix V.

AMADIS OF GAUL (ăm'ȧ-dē), a name frequently mentioned in the early romances of chivalry. Vasco de Lobeira, a Portuguese courtier, who died in 1403, was the author of this romance. It took high rank among some fifteen or twenty written by him. Translations have been made into various languages, among them Italian, English, and German, and it has been widely circulated. The romance is founded on the adventures of Amadis, son of a king of Gaul, who is represented as a model knight. It is related that he traveled through many countries and afterward married Oriana, daughter of the king of England. The romance was probably written about 1380.

AMALGAM (ȧ-măl'gam), a term applied to a class of alloys in which one of the combining metals is mercury. Though mercury readily unites with gold and silver, it does not combine with iron even when heated, and, for this reason, is used to separate gold and silver from the ores, the process being called amalgamation. When properly applied, mercury dissolves and combines with the precious metals and separates them from the waste matter, and afterward is itself driven off by heat. Numerous forms of amalgams are employed in the arts. In this way zinc and tin are prepared for the rubbers of electrical machines, copper and cadmium for uses in dentistry, silver and gold for plating and resilvering, and tin for preparing mirrors. The process of effecting amalgamation differs widely, some forms being produced by rubbing together the two metals, while others are the result of applying electricity. Amalgamations are effected both in solids and liquids.

AMANA COMMUNITY (ăm'a-na kŏm-mū'nĭ-tȳ), a German-American society whose origin dates back to the 18th century. The most successful community now known is located in the northeastern part of Iowa County, in the State of Iowa. The members own in common a tract of about 26,500 acres of land, though less than two thousand persons belong to the society.

AMARANTH (ăm'ȧ-rănth). an order of plants containing nearly 200 known species, native to tropical and temperate countries, but most common in the tropics. The flowers are composed of separate sepals opposite the stamens, usually one-celled anthers, and a single ovary with one or more seeds, and are surrounded by dry, membranous bracts. The cockscomb, love-lies-bleeding, prince's feather, and globe amaranth are common kinds. The name *amaranth* is frequently applied in poetry to an imaginary flower supposed never to fade, and which serves as an emblem of immortality.

AMARILLO, county seat of Potter County, Texas, on the Chicago, Rock Island and Pacific, the Santa Fé, and other railroads. The noted buildings include the court house, high school, federal building, opera house, St. Anthony's Sanitarium, and city hall. It has large machine and railroad shops and a growing trade. The site includes the town Economy, formerly a possession of a German communistic society. Population, 1920, 15,494.

AMASIA (ȧ-mä'sē-ȧ), a city of Asiatic Turkey, on the Irmak River, 200 miles southwest of Trebizond. The surrounding country is fertile and well adapted to silk culture and fruit growing. It has several bazaars, numerous mosques, and a Mohammedan university. In the vicinity are ruins of an old castle and archaic remains. Strabo, the geographer, was born here. Population, 30,000.

AMATI (ȧ-mä'tē), the family name of several violin makers who lived in Cremona, Italy, in the 16th and 17th centuries. Andre Amati, the eldest, was born about 1520 and founded the Cremona school of violin makers. The instruments constructed by Antonio and Gerolimo Amati, about 1650, are held in special esteem by musicians. They are known by the general name of Cremonas, are of comparatively small size and flat model, and excel in purity and sweetness of tone. Countless attempts to improve upon the construction of the violin have produced nothing superior to the instruments made by this family, which are still considered more valuable than any of modern construction.

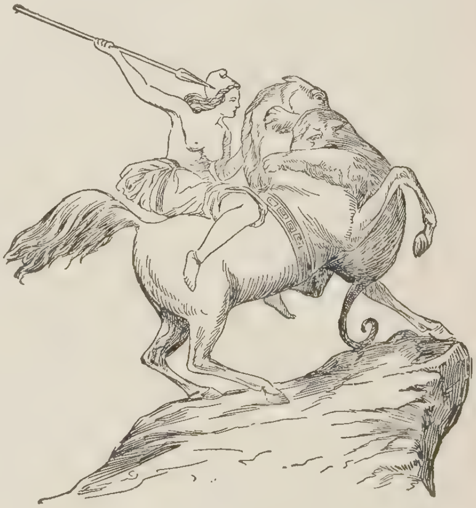
AMATITLAN (ä-mȧ-tē-tlän'), a town in Guatemala, Central America, 15 miles south of the city of Guatemala. It is located on the transcontinental railroad passing from the Caribbean Sea to the Pacific Ocean, hence has a growing trade in produce, especially in salt, cochineal, fruit, and raw silk. Near it is Lake Amatitlan, which is three miles wide and nine miles long. The town was founded by Jesuits, who promoted agriculture and stock raising. The surrounding country produces large quantities of sugar cane. Population, 8,970.

AMAZIAH (ăm-ȧ-zī'ȧh), the ninth king of Judah, son and successor of Joash, flourished about 837 B. C. He conducted a successful expedition against the Edomites, who had been in a state of revolt about 50 years. He captured the gods of the Edomites and introduced their worship into his kingdom, for which he was denounced by the Prophet Amos. In a war against Israel he was unsuccessful and was taken prisoner, but secured his release. He reigned about 28 years and was killed by conspirators at Lachish.

AMAZON (ăm'a-zŏn), the largest but not the longest river in the world, extending nearly across the northern part of South America. It is formed by a large number of head streams in the Andes, drains an area of about 2,500,000 square miles, and has an estimated length of 3,500 miles. It flows into the Atlantic at the equator, where it is 200 miles wide; 1,000 miles from the ocean it is four miles wide, and 2,000 miles from the ocean its width is about one mile. Among the chief tributaries are the Napo, Rio Negro, Jurua, Madeira, Japura, Tapajos, Xingu, and other streams. The Amazon and its tributaries afford about 30,000 miles of water surface suitable for navigation. In its valley is some of the most luxuriant vegetation on earth, being rivaled only in the equatorial region of Africa, and within its forests dwell many kinds of wild animals. The waters of the river system contain an abundance of fish. In the rainy season its banks and the lower courses of its larger tributaries are overflowed, and a large extent of country takes on the appearance of a vast inland sea. Large tracts of country traversed by the Amazon and its tributaries have not been carefully explored, but its basin is known to contain valuable natural resources, such as minerals, timber suitable for construction, and large tracts of fertile land. It is certain that the Amazon basin contains all the natural resources requisite to support vast populations. It is connected with the Orinoco by the Negro and Cassiquiare rivers. Yanez Pinçon discovered the Amazon in 1500, but Francis Orellana, one of Pizarro's officers, first navigated it in 1541. In his report is a description of a nation of female warriors, or Amazons, with whom he engaged in several wars, and from whom the river received its name.

AMAZONAS (ä-mȧ-zō'nȧs), the largest province of Brazil, situated in the northwestern part of that country. It is traversed by the Amazon, has an area of 733,000 square miles, and a population of 162,000. The name is also applied to a department in the northern part of Peru, of which Chachapoyas is the capital.

AMAZONS (ăm'ȧ-zŏnz), the mythical name of a warlike race of women who lived in Asia Minor, near the Black Sea. They were governed by a queen, and, to faciliate the use of the bow, burned their right breast. In Greek mythology it is related that Hercules defeated them, and that Theseus took captive their princess, Antiope. The Amazons fought on the side of Troy in the Trojan War, and their queen, Penthesilea, was killed in a combat with Achilles. Among the many sculptures of the Amazons is that of August Kiss (1802-65),



AMAZON, BERLIN.

entitled "Mounted Amazon Attacked by a Tiger," now in the Museum of Berlin, Germany.

AMBALA (ŭm-bä′lȧ), or **Umballa**, a city in India, in the Punjab, 150 miles northwest of Delhi. It has convenient railroad facilities and an extensive trade, and is surrounded by a fertile country. Its chief buildings are a hospital, a Presbyterian church, a dispensary, and the government house. Ambala was founded in the 14th century. Population, 79,300.

AMBASSADOR (ăm-băs′sȧ-dẽr), a minister of the highest rank sent by a nation to the capital of another to represent there the interests of his country. Ambassadors are termed extraordinary when they are sent on a special mission, and ordinary when sent permanently to the seat of a foreign country. The United States did not appoint ambassadors until within recent years, but there was representation at foreign courts by officers termed ministers plenipotentiary, who were appointed by the President with the approval of the Senate. In 1893 the Diplomatic and Consular Appropriation Bill empowered the President to raise to the rank of ambassador extraordinary the American ministers accredited to any country which should previously confer a similar promotion upon its representative at Washington. Accordingly, Great Britain, Germany, Italy, and France raised their ambassadors at Washington to ambassadorial rank, and the representatives at the courts of Saint James, Berlin, Paris, and Rome were similarly promoted. Japan and several other countries have since named ambassadorships.

AMBATO (ȧm-bä′tō), a town of Ecuador, in the province of Leon, 75 miles south of Quito. It is located on the northeastern slope of Mount Chimborazo. It has a growing trade in cochineal and grain, and mining is carried on in the surrounding country. In 1698 it was destroyed by an eruption of Cotopaxi. Population, 14,000.

AMBER (ăm′bẽr), a hard substance, usually yellow, but sometimes clouded with red or brown. It is brittle, yields easily to the knife, and is translucent and sometimes transparent. Amber is highly electrical, on account of which the Greeks called it *elektron,* and later the word *electricity* originated from it. It is obtained in oceanic and tributary waters, from which it is taken by divers, but also occurs in bituminous beds of wood. The origin of amber is assigned to the remains of timber and other plants that grew in remote ages, perhaps in the Pliocene. Many plant and animal remains have been found in it, about 163 of the former and over 800 of the latter; fully two-thirds of the organisms represented are now extinct. Amber is sold at from $2 to $75 per pound, depending upon its quality. It is used for making ornaments, tobacco pipes, beads, and other articles. An imitation of amber called amberine is a valuable product, and is harder and tougher than the genuine.

AMBERG (äm′bẽrg), a city of Germany, in Bavaria, 32 miles north of Ratisbon. Through it flows the Vils River, and a railroad line connects it with Nuremburg and other important commercial centers. Earthenware, woolen cloths, and machinery are its chief manufactures, and the government maintains here a manufactory of arms. It has a library of 35,000 volumes, an industrial school, and several fine churches. Population, 1905, 24,303; in 1920, 25,222.

AMBERGRIS (ăm′bẽr-grēs), a solid, fatty, inflammable substance derived from the intestines of the sperm whale. It has a gray or blackish color, the shades being variegated like marble, and possesses a peculiar earthy odor. The product is met with near the seashore and in the abdomen of the whales. It is an important article of commerce, and is used largely in the manufacture of perfumes. Genuine ambergris emits a fragrant smell and commands a high price.

AMBOYNA (ăm-boi′na), or **Amboina,** an island in the Indian Archipelago, classed with the Molucca group. The chief products include fruits, cloves, nutmegs, indigo, sago, cocoanuts, and sea-shells. It is inhabited by natives of the Malayan race and a number of Chinese and Europeans, and is a possession of Holland. The city of Amboyna, on the Bay of Amboyna, is the capital. The island has an area of 280 square miles; population about 50,000.

AMBROSE (ăm′brōz), bishop of Milan, an eminent father of the Latin Church, born at Treves, in Gaul, in 340; died at Milan in 397. His father was the Roman Governor of Gaul, but his mother was a Christian, and his education was of a highly virtuous and religious character. He espoused the cause of the Catholics, and was zealous in combating against heathen superstition. In 387 he founded the famous church of Saint Ambrose at Milan, later the Ambrosian Library, and was noted as an advocate and writer. His chief treatises include those entitled "Widows," "Penance," "Duties of Ministers," "Virginity," and "Faith and the Holy Spirit."

AMBROSIA (ăm-brō′zhȧ), in mythology, the food and drink of the gods, and supposed to confer immortal youth. It was not only used for food and drink, but was employed to anoint the gods, and in it they bathed themselves. It was sometimes served to the mortals who were favorites of the gods to give them strength, and with it the hair of Venus and Jupiter was anointed. Later writers say that nectar was the drink and ambrosia the food of the gods.

AMBULANCE (ăm′bů-lans), a covered wagon used in large cities for the conveyance of sick or wounded persons to the hospital. In times of war the name is applied to moving field hospitals, especially such as are constructed by the Red Cross and other societies. These are stationed at the rear of troops that engage in battle. Persons wounded in action are carried hastily to ambulance wagons and conveyed to the field hospital, where they are out of range of artillery fire and are treated by army surgeons. Ambulance wagons were first used in the French army in 1792. They are now in universal use in times of war, and all large cities employ ambulance wagons for the police department to convey both persons and animals that have been injured or wounded.

AMENDMENT (ȧ-mĕnd′ment), in judicial proceedings, a term applied to the correction of errors or the addition offered in the pleadings of a cause. It is also used to designate additions to the constitution of a society, State, or nation. In the Constitution of the United States the following conditions govern the addition of amendments to that document: "The Congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes as part of this Constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided, no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate."

AMENT, William Scott, missionary, born in Owosso, Mich., Sept. 14, 1851. He descended from Dutch parents, was educated at Oberlin College and Andover Theological Seminary, and in 1877 was appointed by the Foreign Mission's Board as a missionary to China. For three years he was located at Paoting, and then was transferred to Peking, where, in 1900, 800 foreigners were besieged by the Boxers. After the siege was raised by the allied forces in June, he and 500 native Christians took possession of the house of a Mongol prince, and it was charged that the company was guilty of looting, though it was afterward proven that only sufficient for support was taken in the form of food and clothing. Dr. Ament is the author of many thoughtful pamphlets and addresses. He died Jan. 6, 1909.

AMERICA (ȧ-mĕr′ĭ-kȧ), the name applied to the land masses of the western hemisphere, which extend from an unknown region in the Arctic Circle to about 55° south lat. The Isthmus of Panama, a neck of land about twenty-eight miles wide at its narrowest point, separates the continent into two grand divisions, known as North and South America. America is bounded on the north by the Arctic Ocean, east by the Atlantic, which separates it from Europe and Africa, south by the Antarctic, and west by the Pacific, which separates it from Asia. The extent from north to south, from the ice fields of the Arctic regions to the southern extremity of Patagonia, aggregates 10,500 miles, and the greatest width is about 3,250 miles. There is a total land surface of 16,237,535 square miles. See **North America, South America, Central America.**

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, a scientific society organized and maintained in the United States. The forerunner of this organization was the association of American Geologists, which was organized in Philadelphia in 1840, and at a meeting held in Boston two years later its scope was enlarged and it became the Association of American Geologists and Naturalists. In 1847 the name was changed to American Association for the Advancement of Science, and to encourage and promote scientific work was declared to be its purpose. While there is no bar which would prevent any person becoming a member, the membership is limited in practice to citizens of the United States and Canada. The nine sections into which the association is divided are mathematics and astronomy, physics, chemistry, mechanical science, geology and geography, zoölogy, botany, anthropology, and economic science and statistics. The chief executive officer is the president, assisted by nine vice presidents, each of whom presides over one of the departments. The society meets annually in the summer in some city of North America, the sections holding separate sessions, and each year the proceedings are published. The reports contain information of great scientific value.

AMERICAN BEAUTY. See **Rose.**

AMERICAN FEDERATION OF CATHOLIC SOCIETIES, an organization promoted by the Roman Catholic Church, and whose headquarters are at Cincinnati, Ohio. The purpose of this organization is declared to be "the cementing of the bonds of Federal union among the Catholic laity and the Catholic societies of the United States; the fostering and protecting of Catholic interests and works of religion, piety, education, and charity; the study of social conditions; and the encouragement of the spread of Catholic literature and of the circulation of the Catholic press."

AMERICAN FEDERATION OF LABOR, an organization of trade unions, whose object is to improve the condition of wage workers. It may be considered the successor of the Knights of Labor, a similar industrial organization. The first convention recognized as official was held in Pittsburg, Penn., in 1881, at which it was declared to be the Federation of Organized Trade and Labor Unions of the

United States and Canada, and the present name was adopted at a trade-union meeting at Columbus, Ohio, Dec. 8, 1896.

On Jan. 1, 1908, the American Federation of Labor included 825 local unions, 473 city centrals, 26 State federations, and 101 national and international unions. The United Mine Workers of America continues to be the largest affiliated union, and others of great numerical strength are the Cigar Makers' International Union, the Brotherhood of Carpenters and Joiners, the Granite Cutters' National Union, and the International Typographical Union. In January, 1923, the membership, excluding all duplicates, was placed at 2,850,000. Samuel Gompers was president until his death in 1924, when he was succeeded by William Green. *The American Federationist* is the official organ.

The primary object is to improve the condition and wages of laborers in all industrial pursuits, for which purpose unions of all classes of wage workers are to be organized and maintained. It is sought to form favorable public opinion through the press, platform, and legislatures, and to secure a reduction in the hours of labor to the toilers, the avowed purpose being to extend industrial progress and improve the status of civilization. It is sought to organize women wage workers, exclude Chinese immigration, establish shorter hours and better remuneration, and protect children under fourteen years of age from labor in factories and mines. To obtain the ends for which organization is maintained, funds are raised by assessment of its members. While it is recommended that all unions seek to prevent strikes and boycotts, they are permitted under extenuating circumstances, and assistance is given to affiliated organizations when necessarily engaged in protracted struggles to secure relief. The union labels being looked upon as important designations, efforts have been made by the executive committee to protect and legalize them.

AMERICAN FORESTRY ASSOCIATION, a society in the United States whose purpose is to promote interest in the forest resources of that country and its territories. It was organized in 1882 and incorporated in 1897, and has a membership of about 2,000. Annual meetings are held, and at these important topics relating to forestry are discussed. The aim is to influence public sentiment in favor of planting trees, preserving forests, and promoting legislation to accomplish these ends. This organization has accomplished much for the welfare of the country by arousing interest to the extent that Congress has been induced to increase the timber reservations, both in number and extent, and the nation and many states have enacted laws to encourage the planting of trees and the protection of forests. *Forestry and Irrigation* is the official organ of this society.

AMERICAN INDIANS. See **Indians.**

AMERICAN INSTITUTE, a society organized in New York City to promote domestic industries. It was founded in 1828 with the purpose of aiding in the development of the State, but ultimately the aim became broader and encouragement was given to agriculture, arts, manufacturing, and commerce in the entire country. Interest is promoted by fairs and exhibitions. This organization early recognized the value of the McCormick reaper and other useful inventions, such as the stocking loom, the telephone, the metallic lifeboat, the telegraph, and the milk separator, and by its recommendations and public reports stimulated interest in the use of these and others valuable in the productive industries.

AMERICANISMS (ȧ-mĕr'ĭ-kȧn-ĭz'm), a term applied to certain expressions in the English language used extensively in the United States. They consist chiefly of words coined in America, or of words and terms obsolete in Great Britain, or which have been modified in meaning by usage. Some words and idioms are local, while others have come into general use. The following embraces a representative list, though it does not include all the Americanisms:

Advantage, as a verb instead of profit.

Backwoods, a partially cleared forest region.

Baggage car, instead of luggage van.

Blizzard, a storm of snow or sleet.

Bogus, meaning false, counterfeit, fraudulent.

Boss, an employer of laborers, a leader.

Broncho, a western horse of small size.

Bug, a beetle.

Buggy, a vehicle with four wheels.

Bulldoze, meaning to intimidate.

Buncombe, used in the phrase to "speak for Buncombe," a common quotation, meaning to speak only to catch applause or favor.

Bureau, a dressing table with drawers.

Calculate, to think, to suppose, to believe.

Calico, meaning prints, printed muslin goods.

Canebrake, a thicket of canes.

Canyon, a deep depression or gorge.

Caucus, a preliminary meeting of politicians, held either by the members of a party in a voting precinct, or by members of a convention or legislative body.

Chunk, a part or piece of any material.

Clever, meaning obliging or good-natured.

Cowboy, a western drover or cattle herder.

Creek, a small stream or river.

Cracker, a bake or biscuit.

Creole, in the Gulf States, a person of French or Spanish descent.

Cunning, sly or crafty, pretty or pleasing.

Deadhead, to make free use of public conveyances, or to have free entrance to places where admission is charged.

Depot, a tramway or railway station.

Down East, the New England States.

Drummer, a solicitor, a commercial traveler.

Dry goods, the articles sold by drapers, mercers, and haberdashers.

Dress, the gown worn by a woman.

Dude, a dandy, a man dressed in the height of fashion.

Endorse, to approve, confirm, sanction.

Fall, meaning autumn.

Fancy, the opposite of plain or common, as fancy horses, fancy silks, fancy store, fancy dress.

Fish dealer, a fishmonger.

Fix, to adjust, to put in order.

Gerrymander, a word derived from the name of Elbridge Gerry, a signer of the Declaration of Independence, who devised a scheme to divide Massachusetts into districts in such a manner that the political party to which he belonged could elect a majority of the General Assembly. The term is now applied to the arrangement of political divisions in the interest of one party over its opponent, and in such instances it is said that the district so organized has been gerrymandered.

Given name, the first or Christian name.
Hang around, to be near to or loiter about a place.
Hardware merchant, an ironmonger.
Help, a servant, servants, or service.
Homely, plain, simple, unadorned.
Hustle, to hasten, to hurry.
Improve, to ameliorate real estate by care or cultivation.
Jew, to haggle with the view of getting a better bargain.
Johnnycake, bread or cake made of Indian cornmeal.
Lasso, the art of catching horses or cattle with a rope.
Loafer, a vagrant, a lounger.
Lobby, to attempt to influence legislation by the personal solicitation of the members of a legislature. *To lobby through* is to get a bill adopted by such influence.
Logrolling, a system of management by which a member of a political party or a legislative body attempts to secure advantage for or the adoption of a favorite measure.
Lot, an allotment, a small piece of land.
Lynch law, capital punishment executed without legal authority or without a trial, either by a mob or by the populace.
Mail, used instead of post.
Moccasins, a shoe of soft leather, either made to button or to lace, and sometimes provided with a sole.
Notions, small wares.
One-horse, anything of little importance.
Pantaloons, meaning trousers.
Pickaninny, a small Negro child.
Platform, a declaration of the principles upon which a person, a sect, or a party proposes to stand, each division of which is called a *plank*.
Posted-up, to be well informed.
Rooster, the domestic cock.
Saloon, a taproom.
Sleigh, a sledge; sleigh riding, for sledge driving.
Smart, meaning considerable or important.
Span, from the German, *gespann*, meaning a pair of horses or mules.
Stampede, to flee suddenly.
Store, a shop, as a drug store, a book store.
Suspenders, used instead of braces.
Succotash, maize and beans boiled together.
Tenderfoot, a western term, meaning a newcomer.
Transient, a stranger, a traveler.
Truck, small produce grown in gardens.
Typist, one who can operate a typewriter.
Wilt, to droop, to wither, to decay.

AMERICAN LEGION. See **Legion, The American.**

AMERICAN LITERATURE, the written and printed productions of American writers. The term is popularly applied in the United States to the productions of writers confined within the area or under the jurisdiction of that country, but in a broader sense it applies to the collective writings of all Americans. In the latter sense it embraces the literature of Canada, Mexico, Brazil, and the other American countries. The literature of Canada is more nearly associated with that of England than that of the United States, a condition arising from its colonial dependence, but, like the latter, is largely in the English language. The writings of the other American countries, except Brazil, are practically all in the Spanish, while those of Brazil are in the Portuguese. In the scope of this article it is possible only to give an outline of the literature of the United States. For Canadian literature, see Canada, subhead Literature.

It may be said that the advantage of studying the literature of a nation consists in becoming acquainted with the best thoughts of its best minds. Such writings reveal to us the highest ideals and the noblest motives that prevailed while the nation passed through successive periods of growth and development. Thus, the reader becomes influenced by such thoughts and motives as actuated the writers of literature, and the best that is in him is called into action. In the literature of America we find much to commend, especially because it presents to us a remarkable transition from the literature of Europe to the writings that are purely American in thought and sentiment. Though principally in the English, there are a large number of American writings in the German, French, and Swedish. The German writers are particularly numerous, and include such eminent men as John Winebrenner, W. A. Muhlenberg, Carl F. W. Walther, Louis J. R. Agassiz, Henry T. Tuckermann, and Carl Schurz, all of whom are treated in special articles.

American literature may be divided into two general periods: from its beginning to 1840, and from 1840 to the present time. However, the former may for convenience be subdivided into the Colonial, the Revolutionary, and the Transcendental periods. If we speak of literature in the stricter sense, which embraces the writings characterized by beauty of form and artistic style, it may be said that American literature begins properly with Washington Irving. However, in the Colonial period we have writings closely associated with history, and, for that matter, there is a close relationship between all literature and history.

Colonial Period. The early settlers were men of action, using the ax and the musket more than the pen, but we have a number of excellent works dating from the Colonial period, which embraces the epoch included in 1620-1775. Captain John Smith produced the first three books written in America. The first of these, "General History of Virginia," contains an account of the early colonists in America, and was printed in London shortly after the settlement at Jamestown. Smith's second book is a reply to complaints made by the London stockholders of the Virginia Company, and his third, published in 1612, is entitled "Map of Virginia." The writings of Smith consist rather of history than literature, but contain the first Virginian romance in the story of Pocahontas. George Sandys (1577-1644), in Virginia, made a version of Ovid's "Metamorphoses" in 1620, which was really the first purely literary production completed in America.

The establishment of Harvard College in 1636 gave an impetus to educational effort, and the desire for intellectual advancement was further extended by the founding of William and Mary College in 1693 and Yale University in 1701. In 1639 the first printing press was set up at Cambridge, Mass., and the first book printed in America appeared in 1640, entitled "Bay Psalm Book." It was not strictly original, and was edited by a number of eminent colonists, among them John Eliot, who also translated the Bible into the Algonquin language, but it proved very popular and went through many editions. Anne Bradstreet, of Massachusetts, issued a volume of poems in 1650, entitled "Tenth Muse," which was published in an enlarged form at Boston in 1678. William Bradford (1589-1657), Governor of Plymouth, published the first annals of New England, entitled "History of Plymouth Plantation," and John Winthrop wrote "History of New England." Both these works are of immeasurable value in describing the life and times of the colonists, and from them many subsequent writers have drawn inspiration for a number of valuable works, including Whittier's "John Underhill," Longfellow's "New England Tragedies," and Hawthorne's "Scarlet Letter." Samuel Sewall (1652-1730) was the first to denounce the crime of slavery in his tract, entitled "Selling of Joseph."

Many of the colonial writings were by Puritan pastors, and are devoted to a discussion of the doctrines and history of the colonial church. These include Cotton Mather's "Magnalia Christi Americana," and other works from the same author, all of which are written more or less in the style of Milton. His "Wonders of the Invisible World" was a leading factor in the Salem witchcraft trials, while his "Essays to Do Good" was praised by Franklin, who declared it a potent factor in influencing his life for good. The writings of Cotton Mather embrace 382 publications, but most of them have not been preserved. Roger Williams was the foremost advocate of religious tolerance and a strong sympathizer with those who advocated kind treatment of the Indians, and criticized the intolerance of the Puritans in several excellent writings.

Jonathan Edwards, a student of Yale, minister, and president of Princeton College, attained the foremost place among the early preachers of America. He published "Freedom of the Will," a profound discussion of Calvinism, and "Treatise Concerning Religious Affections," a masterly analysis of the movements of the mind under religious influences. To this period also belongs Benjamin Franklin, who was presented by France with a medal bearing the inscription, "He seized lightning from heaven and the sceptor from tyrants." He first attained fame by publishing "Poor Richard's Almanac," which he issued annually for twenty-five years, beginning in 1732. This publication was immensely popular on account of its concise calenders, and in the spaces between the notable days were pungent sayings containing excellent morals, such as, "It is hard for an empty sack to stand upright," "The cat in gloves catches no mice," "One to-day is worth two to-morrows," "Little boats should keep near the shore," "God helps them who help themselves," "He that goes a-borrowing goes a-sorrowing," "Little strokes fell great large oaks," "Dost thou love life, then do not squander time, for that is the stuff that life is made of," and "Who dainties love shall beggars prove." The longest and most interesting of his works is his "Autobiography," but his shorter writings are also of interest, particularly "Dialogue Between Franklin and the Gout," "Story of the Whistle," and his works on scientific subjects, entitled "Papers."

Revolutionary Period. The literature of the Revolutionary period embraces many excellent works devoted to the discussion of political rights, much of which appeared in the form of speeches by eminent champions of liberty. These include Samuel Adams, Josiah Quincy, Patrick Henry, Thomas Jefferson, Alexander Hamilton, James Madison, George Washington, and Thomas Paine. The most noted of these writings embrace the works of Thomas Jefferson, who wrote "Notes on Virginia," the "Declaration of Independence," and many able state papers. Alexander Hamilton, of whom Webster said, "He smote the rock of national resources and abundant streams of revenue burst forth," contributed many papers as treatises on government in the *Federalist,* and may be regarded the father of the American financial system. The *Federalist* published at various times a number of contributions from John Jay and James Madison. The latter made the first draft of the national Constitution and published the "Madison Papers," embracing the debates and speeches of the constitutional convention. Madison's "Notes on Virginia" and his first "Inaugural Address" take high rank in the literature of this period. The writings and state papers of George Washington fill twelve volumes, but his "Farewell Address," which was prepared and published in 1796, is the most celebrated. Fisher Ames produced many excellent orations during the administration of John Adams. The best of these were delivered in 1796 and relate to the treaty with Great Britain. Thomas Paine exerted a strong influence on the colonists by publishing his "Common Sense," which was issued immediately preceding the Revolution, and afterward went to France and published "Rights of Man" in reply to Burke's "Reflections," the latter relating to a justification of the French Revolution. Subsequently he forfeited his great popularity in America by publishing "Age of Reason," in which he attacked the Christian religion.

Little poetry of note was produced in the period of the Revolution, and the valor of its heroes remained unsung for more than a generation after independence was secured. The most noted poem of this period is "McFingal," by John Trumbull, which appeared in part in 1775 and in a complete form in 1782, and went through thirty editions in America. Though a fine American political satire, it is rather droll, but has touches of real humor, and was intended as a satire on the Tories of America.

Some parts of it have come to us as proverbs, for instance:

"No man e'er felt the halter draw
With good opinion of the law."

The "Columbiad," an epic in ten books, was published by Joel Barlow (1755-1812), who is also author of the humorous poem, "Hasty Pudding." Timothy Dwight (1752-1817), president of Yale for twenty-one years, is the author of an epic in eleven books, the "Conquest of Canaan," but is better known by his many church hymns, such as, "I Love Thy Kingdom, Lord." "Yankee Doodle" sprang up in the Revolutionary period, and was first played and sung by the British in derision of the New Englanders, who afterward adopted it as a military air. Francis Hopkinson (1737-1791), a signer of the Declaration of Independence, wrote the humorous ballad, "Battle of the Kegs," and his son, Joseph Hopkinson (1770-1842), wrote the popular song "Hail Columbia." The "Star Spangled Banner," another famous national song, was written by Francis Scott Key at the time the British invaded the United States, in 1814. Philip Freneau (1752-1832) attained fame by his "Wild Honeysuckle," "Indian Burying Ground," and other graceful poems regarded as forerunners of the lyrics of Bryant and Longfellow. The first American man of letters to maintain himself altogether by his writings was Charles Brockden Brown (1771-1810), a Quaker of Philadelphia, who may be regarded a forerunner of Poe and Hawthorne. His best-known writings include "Wieland," a heroic romance, and "Arthur Mervyn," a description of the plague which ravished Philadelphia in 1793.

Transcendental Period. The American writings up to the close of the 18th century were largely imitations of the English models, and the *Edinburgh Review* sneeringly asked, "Who reads an American book?" Though there was no immediate reply that seemed to satisfy, a new era in American literature dawned when Washington Irving published his "Knickerbocker's History of New York." This work appeared in 1809, and not only stood on its own merits, but at once sprang into great popularity. From that time until 1826 Irving busied himself largely with the "Sketch-book," which includes the famous short stories of "Rip Van Winkle" and "Legend of Sleepy Hollow." Other writings by this famous author embrace "Tales of a Traveler," "The Alhambra," "Astoria," "Life of Washington," and "Life of Oliver Goldsmith." James K. Paulding (1779-1860) published "Life of Washington" and a number of novels; Gulian C. Verplanck (1786-1870) published an edition of the "Plays of Shakespeare;" Fitz-Greene Halleck (1790-1867) is the author of "Marco Bozzaris;" Joseph Rodman Drake gave us his poems "Culprit Fay" and "The American Flag;" and Nathaniel Parker Willis (1806-1867) founded the *Youth's Companion,* a publication famous for its literature suitable for youth. To this period of literature belong the writings of James Fenimore Cooper, who may be regarded the earliest eminent novelist whose style is distinctively American. In 1820 he published "The Spy," the first American historical novel, in which he gave the American public an interesting story of the Revolution. He published "The Pioneers" in 1823, and soon after followed the first of the series of five "Leather Stocking Tales." Cooper himself invented "Leather-Stocking," *Natty Bumpo,* who is represented as a back-woods philosopher and is the most original invention of character added to the world's literature by an American. Subsequently he published a series of sea tales, including "The Pilot," "The Red Rover," and "Wing and Wing." Cooper could not easily endure adverse criticism, and as a defense wrote several tracts against his opponents and brought a number of suits for damages. The romances of the sea and of the forest are his invention, in which he excelled, but in humorous efforts he was not successful. Several poets of this period succeeded in writing single poems that became great favorites, among them "Home, Sweet Home," by John Howard Payne; "I Would Not Live Alway," by William Muhlenberg; "The Old Oaken Bucket," by Samuel Woodworth; and "My Life is Like a Summer Rose," by R. H. Wilde.

William Cullen Bryant may be classed in this period. A poet at the age of nine years, he published a volume of verse at fifteen, entitled "Embargo." His "Thanatopsis," written at eighteen, shows mature thought and stately expression, and its gravity and dignity in blank verse is unexcelled by any recent writer. No one knew better than Bryant how to give interest to the solemnity of the forest and mountain, and to paint the impersonal beauty of nature. His individual poems include "Death of the Flowers," "Forest Hymn," "To a Water-Fowl," and "Fringed Gentian;" while among his stories of interest are "Letters of a Traveler" and "Tales of the Glauber Spa." He made a translation of Homer, spending four years on the "Iliad" and two years on the "Odyssey." Edgar Allen Poe is best known as author of the "Haunted Palace" and of "The Raven," and his best work in prose is his "Tales of the Grotesque and the Arabesque." He is well known as a critic and classed Hawthorne as a great novelist and Longfellow as a worthy poet before either was known to the world. Nathaniel Hawthorne may be regarded the greatest American novelist. His first production to attract attention appeared in 1837 as a part of the series known as "Twice-Told Tales." At Concord he published "Mosses from an Old Manse" and another installment of "Twice-Told Tales."

The "Snow Image," the most beautiful of his tales, appeared some time later. In 1850 he published "The Scarlet Letter," which may be regarded the most artistic product in American literature. The scenes of his writings are laid within the limits of Massachusetts; "Marble Faun" is the only exception. Other well known writings from the pen of Hawthorne include "Great Stone Face," "Grandfather's Chair," "Tanglewood Tales," "House of Seven Gables," "Blithedale Romance," and "Legends of the Province House."

This period of American literature is famous as an epoch of orators, including such eminent statesmen as Daniel Webster, Henry Clay, John C. Calhoun, and Edward Everett. Daniel Webster may be regarded the greatest American orator, and his speeches rank in literature with those of Demosthenes, Cicero, and Burke. His membership in Congress covered a period that called for men of strong intellectual and oratorical powers, and the events connected with his life were such as to bring out to the best advantages his great fertility of mind. The most famous of his orations include the one delivered at the laying of the cornerstone of Bunker Hill monument in 1825; the one at the completion of the monument in 1843; eulogies of Presidents Adams and Jefferson in Faneuil Hall, Boston, in 1826; his reply to Hayne in 1830; and his oration on Washington in 1832. These orations embody the finest sentiments of Americanism, and convey as a central thought that the Union should be preserved at whatever cost. Henry Clay, the *Great Reconciler,* is the author of the Missouri Compromise; of the Act of 1833 settling Nullification, and of the compromise measures of 1850. Calhoun ranks rather as a debater than as an orator, but his sympathies extended more closely to his own section, the South, than to the whole country. A champion of state rights, he contributed the most able arguments in favor of that view in government. Everett belonged to the illustrious orators of Boston, but he did not possess the massive strength of Webster. None of his contemporaries had so complete an education, and his speeches are among the most polished contributed to American literature. Other eminent orators of this period include Rufus Choate, an orator of much intellectual strength, and William Ellery Channing, famous as a leader in the Unitarian movement. The latter is the author of two very able works: "Life of Napoleon Bonaparte" and "Essays on John Milton."

Ralph Waldo Emerson, the friend of Carlyle, ranks as an eminent writer of this period, and is particularly famous as a factor in the Carlyle-Emerson correspondence. His prose works were mostly delivered as lectures, and include "Society and Solitude," "Representative Men," and "Letters and Social Aims." Many passages in his writings are majestic in thought and rhythm, but his style is the condensed epigrammatic. His oration on the "American Scholar," delivered in 1837, is an epoch-making production, and his chief poems are "Snow Storm," "Concord Hymn," and "Bumble Bee." The transcendentalists, who supported a form of idealism, include Emerson, who may be regarded the greatest of this class of writers. They represent the idealistic in poetry and prose, thus favoring the German philosophy rather than the English materialistic writings. *The Dial,* a periodical published at Concord, was the chief organ of the transcendentalists, and in it were published the chief poems and prose writings of this school. Louise M. Alcott, author of "Little Women," "The Old-Fashioned Girl," and "The Spinning-Wheel Stories," belonged to this class of writers. Other writers include Henry David Thoreau, who found intense enjoyment in simple life and spent two years in a cabin on the shores of Walden Pond, Concord, where he lived as a means of closely observing nature. The best known of his works embrace "A Yankee in Canada," "The Maine Woods," and "Cape Cod." Margaret Fuller (1810-1850) was prominent in this class of writers, and is well remembered by her plea for equality before the law, and by her "Woman in the Nineteenth Century," "A Summer on the Lakes," and "Papers on Literature and Art."

RECENT PERIOD. The second period of American literature, that from 1840 to the present time, begins with the so-called Cambridge poets, whose center was at Harvard College. These writers embrace four of the most famous Americans: Longfellow, Holmes, Lowell, and Whittier. Henry W. Longfellow, though influenced by the literature and historic associations of Europe, is eminently American in the treatment of his subjects. Endowed with an appreciative nature and enriched by college life, select reading, and foreign travel, he has never been surpassed in American literature. In 1841 he published such favorite poems as "The Village Blacksmith," "The Skeleton in Armor," and "The Wreck of the Hesperus," and soon after gave us "The Old Clock on the Stairs." His greatest poem, "Evangeline," appeared in 1846, and is the story of an Acadian peasant girl. In 1855 he published "Hiawatha," an interesting poem, treating of the legends and traditions of the American Indians, whose plan was suggested by the German translation of the Finnish epic, "The Kalevala." Other writings of Longfellow include "Miles Standish," "Building of the Ship," and "Belfry of Bruges." Oliver Wendell Holmes is particularly famous for his "Autocrat of the Breakfast Table," which appeared in the *Atlantic Monthly* in 1857, and afterward followed "The Professor," "The Poet," and "Over the Tea-Cups." His three novels include "Mortal Antipathy," "Elsie Venner," and "Guardian Angel." "Chambered Nautilus," "Old Ironsides," "The Last Leaf," and "Height of the Ridiculous" are among his excellent poems. James Russell Lowell inherited culture, if that is possible, and acquired an excellent education at Cambridge. He published three books in the autumn of 1848: "Sir Launfal," "Bigelow Papers," and "Fable of Critics." He is not a mountain poet like Bryant, or an ocean poet like Whittier, but touches with great beauty the birds, trees, and flowers. In his poems are included "The Courtin'" and "Indian Summer Reverie." "Among My Books" and "My Study Windows" are excellent critical works. John Greenleaf Whittier, frequently called the poet of anti-slavery, is the favorite American poet of many students. His writings show that he lived a dual life, one in the world of fancy and one in the world of fact, as is shown in his "Bare-Foot Boy" and "In School Days." The first half of his literary career was marked by earnest opposition to slavery, the writings of this period embracing productions both in verse and prose. His "Laus Deo," written when the bells pealed for the abolition of slavery, is the last lyric of this period. "Snow Bound" is a winter idyl, "Maud Müller" and "Among the Hills" are exceedingly graceful, and "Telling the Bees" is the most pathetic of his productions. Whittier ranks with Bryant as a nature poet, but he reflects the calm and beauty of scenic nature, while Bryant relies upon placing strength in the objects of his descriptions.

Harriet Beecher Stowe is famous in the antislavery group of writers, and is best remembered by her "Uncle Tom's Cabin," "Dred: A Tale of the Dismal Swamp," and "The Minister's Wooing." Wendell Phillips was the orator of antislavery, and devoted his education, wealth, legal abilities, and oratorical powers to the cause he espoused. He was recognized as the representative of the movement in Faneuil Hall in 1837, which continued active until the Emancipation Proclamation was issued in 1863. William Lloyd Garrison's writings are important in the history of the antislavery movement rather than in literature, but they contain many lofty and inspiring thoughts. The speeches of Charles Sumner, published complete in twelve volumes, are scholarly and powerful arguments and supply almost a complete history of the contest.

William Hickling Prescott takes high rank among the distinguished American historians, and his first famous work is "The Reign of Ferdinand and Isabella." He published "The Conquest of Mexico" in 1843, "The Conquest of Peru" in 1847, and "The History of Philip II." in 1855. No one has surpassed Prescott in his treatment of these themes, but his work was done under great difficulties, owing to the fact that he was partly blind during a large part of his life. George Bancroft is famous among the historians who wrote of the Colonial and Revolutionary periods, and published the first volume of his "History of the United States" in 1834, and finally completed it in 1885. In this work he spent over half a century, consulting the archives of America and Europe for that purpose, and his writings are remarkably accurate in descriptive details. John Lothrop Motley stands preëminent as a historian, and in 1856 published "The Rise of the Dutch Republic," a historical work of vast value. Other writings from his pen include "The United Netherlands" and "Life of John of Barneveld." Francis Parkman is another famous historian. The difficulty under which he labored resembled that of Prescott, and he was confined in a dark room and unable to read for three years. His writings include "The Oregon Trail" and "The Conspiracy of Pontiac." Other famous historians include Jared Sparks, author of "Library of American Biography;" George Ticknor, writer of "History of Spanish Literature;" Horace Greeley, author of "Prayer of Twenty Millions;" and Alexander H. Stephens, writer of "Corner-Stone of the Confederacy." Other names that belong to the group of historians include Benson J. Lossing, Jefferson Davis, John Fiske, John Clark Ridpath, Justin Winsor, Carl Schurz, John Bach McMaster, and Herman Eduard von Holst.

The famous pulpit orators include Henry Ward Beecher, author of "Lectures to Young Men," "Aids to Prayer," and "State Papers." James Freeman Clarke, a Harvard man, published "Ten Great Religions," and Thomas Starr King, the famous Unitarian pastor of Boston, wrote on religious and patriotic subjects and published "White Hills." David Swing is the author of "Life Immortal" and "Truths for To-day;" DeWitt Talmage published many sermons and religious writings. Chas. M. Sheldon is the author of "In His Steps," "For Christ and the Church," and many other writings.

The general writers are very numerous. Bayard Taylor, author of "Views Afoot" and "Songs of Summer," and translator of Goethe's "Faust," takes high rank. Walt Whitman won extensive notice by his "Leaves of Grass," which appeared in 1855, and afterward published "Drum Taps" and "Memoranda" during the war. Will Carleton is eminently popular as the author of "Poems of Farm Life" and as a lecturer, while James Whitcomb Riley has attained much popularity. His best-known writings include "Afterwhiles," "Knee Deep in June," and many popular poetical and prose writings in the hoosier dialect. Eugene Field is famous as a writer of poems for children, such as "Little Boy Blue" and "Wynken and Blynken and Nod," but we are also indebted to him for many humorous and satirical writings. Bret Harte is remembered for his "Luck of Roaring

Camp" and "Outcasts of Poker Flat;" Joaquin Miller for his "Songs of the Sierras;" and E. E. Hale for his "Man Without a Country." A. E. Sweet, Josh Billings, Artemus Ward, Robert J. Burdette, E. W. Nye, Samuel L. Clemens, and Francis R. Stockton are among the well-known humorists.

The recent essayists include Josiah G. Holland, Charles D. Warner, John Burroughs, and Donald G. Mitchell. Edmund C. Stedman, Edwin P. Whipple, George W. Curtis, and Richard G. White are among the critics. The recent women verse writers embrace Alice and Phoebe Cary, Helen H. Jackson, and Lucy Larcom. Henry James, W. D. Howells, George W. Cable, Thomas W. Higginson, Edward Eggleston, Elizabeth Stuart Phelps, Edward P. Roe, and Henry James Howells are among the recent novelists. The miscellaneous writers embrace Maurice Thompson, Ella Wheeler Wilcox, George Ade, R. H. Stoddard, George Edward Woodberry, Richard Hovey, Thomas Bailey Aldrich, Theodore Roosevelt, Edward S. Ellis, Henry Harland, J. K. Bangs, Marietta Holly, and Mary Roberts Rinehart.

AMERICAN PARTY. See **Know Nothings.**

AMERICAN UNIVERSITY, a coeducational institution located in Washington, D. C. Three schools are maintained: College of Liberal Arts, School of the Political Sciences, and Graduate School. The College of Liberal Arts is open to high school graduates, and confers the degree of B. A. after four years work; the School of the Political Sciences is open to students who have completed at least two years of college work, and confers the degree of Bachelor of Political Science after the completion of two years work; the Graduate School is open only to college graduates and offers work leading to the degrees of Master of Arts, Master of Political Science, and Doctor of Philosophy. The institution was chartered in 1891, and is under the patronage of the Methodist Episcopal Church. The value of the property is $2,000,000, the endowments aggregate $800,000, and the attendance aggregates 280 students.

AMERICUS (ȧ-mĕr'ĭ-cŭs), a city in Georgia, county seat of Sumter County, 70 miles southwest of Macon, on the Georgia and Alabama and the Central of Georgia railroads. It has a considerable trade and is surrounded by a fertile country. There are excellent schools and churches, good municipal facilities, and a Negro college. The manufactures embrace machinery, tobacco products, utensils, earthenware, and clothing. The first settlement in its vicinity was made in 1832 and it was incorporated in 1855. Population, 1920, 9,010.

AMERIGO VESPUCCI. See **Vespucci, Amerigo.**

AMES (āmz), **Fisher,** statesman and orator, born in Dedham, Mass., April 9, 1758; died there July 4, 1808. He first became generally known on account of several political essays published by him in Boston newspapers under the signatures of *Brutus* and *Camillus,* and, when his authorship became known, he formed the warm friendship of leading public men of his State. In 1788 he was a member of the Massachusetts convention that ratified the Federal Constitution.

AMES, Oakes, public man, born in Easton, Mass., Jan. 10, 1804; died May 8, 1873. He engaged in the manufacture of shovels and picks as member of the firm of Oliver Ames and Sons, and became wealthy on account of the large market for these utensils during the gold excitement in California and Australia. In 1861 he was chosen a member of the Massachusetts executive council, and served in Congress from 1863 to 1873. He supported the building of the Pacific railroads and became connected with the Credit Mobilier scheme, on account of which he withdrew from public service.

AMES, a city in Story County, Iowa, 36 miles north of Des Moines, on the Chicago and Northwestern Railroad. It has electric street and interurban railways. The chief features include the high school, federal building, and the Iowa State College, a noted center of learning. The streets are paved and well lighted. Population, 1920, 6,270; in 1925, 9,332.

AMESBURY (āmz'bĕr-ĭ), a town in Essex county, Mass., forty-two miles north of Boston, on the Boston and Maine Railroad. It has electric street railway facilities, waterworks, several libraries, and excellent school and church buildings. The manufactures include automobile bodies, hats, peanut products, and machinery. It was the home of the poet, John G. Whittier, who removed here in 1836 and made it his residence until his death. Amesbury was incorporated in 1666. Population, 1905, 8,840; in 1910, 9,894; in 1925, 11,229.

AMETHYST (ăm'ė-thĭst), the name of a crystallized quartz or rock, usually purple or bluish violet in color. Varieties that are characterized by beauty and hardness command a high price. The color is not always uniformly diffused, and by candlelight it appears less brilliant than in sunlight. The best specimens are brought from Ceylon, Armenia, Arabia, and India. Amethyst is regarded a precious stone. and is used largely in making rings, seals, and other articles of jewelry. The Greeks supposed that it was a protection against drunkenness and recommended that it be worn by those addicted to that habit.

AMHERST (ăm'ẽrst), a town of Massachusetts, in Hampshire County, 23 miles north of Springfield, on the Vermont Central and the Boston and Maine railroads. It is beautifully situated in the valley of the Connecticut River, within sight of Mount Holyoke, and is the seat of Amherst College. It has manufactures of straw hats and a considerable trade in produce and merchandise. The first settlement was made in its vicinity in 1703. Population, 1905, 5,313.; in 1925, 5,972.

AMHERST, a town of Nova Scotia, capital of Cumberland County, nine miles east of Sackville. It is located on the Canadian National Railway and on an arm of Cumberland Bay. Shipbuilding is the chief industry, and coal is mined in its vicinity. Population, 1901, 4,964; in 1926, 8,500.

AMHERST COLLEGE, an educational institution at Amherst, Mass., founded as the Collegiate Institute of Amherst in 1821, but changed to Amherst College in 1825. The property and endowments are valued at $6,500,000. It has a faculty of fifty-nine instructors, 650 students, and a library of 150,000 volumes. The institution carries advanced courses of study, and numbers among its alumni some of the most prominent educators of America. It is maintained in the interest of general education, was founded by an association of Congregational and Presbyterian ministers, and offers courses and opportunities of high rank for both sexes.

AMICUS (ä-mē′chês), **Edmundo de,** soldier and author, born at Oneglia, Italy, Oct. 21, 1846. He received a military education and entered the army of Italy in 1865, and the following year participated at the Battle of Custozza against the Austrians. In 1870 he retired from the military service to take up literature, and with that end in view visited Northern Africa, Western Asia, South America, and many countries of Europe. From these travels he secured much material for his writings, which include works on educational topics as well as travels and fiction. "The Heart of a Boy," a work intended for young people, is one of his best known productions and has been widely translated.

AMIENS (ä-mĭ-ăn′), a city of France, capital of the department of Somme, seventy miles north of Paris. It is finely located on the Somme River, which is navigable for small craft, and has excellent railroad and electrical car line advantages. The streets are regularly platted and paved, and it is the seat of a Gothic cathedral, one of the finest in Europe. It has a fine public library of 100,000 volumes, several parks, and a statue of Peter the Hermit. Amiens is noted for its extensive manufactures of velvet and cotton goods. The Treaty of Amiens, which restored peace between France, Holland, England, and Spain, was concluded in 1802. The Germans captured it in 1870 and in 1914, but lost it within the latter year and were unable to recapture it by sanguinary fighting in 1918, being defeated between Albert and Montdidier. Population, 1919, 91,782.

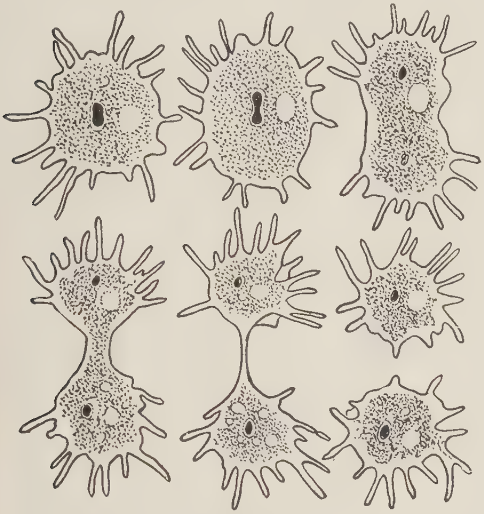
AMMEN (ăm′en), **Jacob,** soldier, born in Botetourt County, Va., Jan. 7, 1808; died Feb. 6, 1894. In 1831 he graduated from the United States Military Academy, was instructor in mathematics at West Point and at the University of Indiana, and at the beginning of the Civil War became captain of volunteers. By gallant services he attained to the rank of brigadier general. He took part in many important battles, serving as commander of the military district of East Tennessee, and in 1865 retired from the service.

AMMON (ăm′mŭn), an ancient diety worshiped in many countries of Africa and Europe. The Egyptians celebrated him in temples at Thebes and in the Libyan oasis of Ammonium, and dedicated many statues to his honor. He was worshiped by the Greeks as identified with Zeus, while the Romans associated him with Jupiter. In statuary he is represented as a man with a ram's head.

AMMONIA (ăm-mō′nĭ-ȧ), a volatile alkali. It is a colorless gas, having a penetrating, pungent odor and a burning taste. Though combustible, it will not burn in air. It was first made in the Libyan Desert, in Africa, from decaying animal matter gathered by the Arabs at the temple of Ammon, hence the name ammonia. The name *hartshorn* is frequently applied to this substance from the circumstance that it may be prepared by making shavings of horns. It is now derived chiefly by distilling coal and refuse animal substances gathered promiscuously, such as hoofs, horns, bones, etc. Ammonia is also obtained from vegetable matters, when it contains a considerable per cent. of nitrogen. The chief uses are for medicine, for motive power, and in the manufacture of ice.

AMMUNITION (ăm-mû-nĭsh′ŭn), the primer, powder, and projectiles used in firearms. These articles are made up ready for use in small arms and small cannon, when it is known as *fixed ammunition,* and in the larger guns they are put in separately. The projectile used in a large gun is put in first, after which the powder, handled in a brass case or in cloth bags, is placed, and the primer explodes the charge. Fixed ammunition is put up in cases of brass and pasteboard, or in cases entirely of brass, and in this form is sold on the market, or the cases may be obtained separately and afterward loaded to meet the requirements. The government of most countries supervises and controls the manufacture of ammunition for the army, or it is manufactured to order under careful inspection. Formerly field artillery carried between 150 and 200 rounds per gun with the battery and a reserve of as much more, but at present the quantity kept ready for use is larger, since the rapid-fire and automatic guns make it necessary to have a large supply available. The ammunition in the caissons is used first, and further supplies are drawn from the ammunition columns, the rule being to use the ammunition in the limber only when no other is available.

AMOEBA (ȧ-mē′bȧ), a genus of microscopic animals, belonging to the lowest class of Protozoa. Several species have been described, all of which are viscid like glue, and the specific gravity is little greater than water.



AMOEBA.

Showing how an amoeba is divided in the process of growth.

An amoeba is an irregular mass of protoplasm, semi-transparent, and has the power of locomotion by means of a streaming movement of the protoplasm. A small portion within the mass, called the *nucleus,* is somewhat darker than the general brown color, and small projections, known as *pseudopodia,* are thrust out at certain points of the body while others behind them are retracted, and it is by these processes that locomotion is possible. The same motion is essential in taking in food, which is done by the pseudopodia flowing around digestible objects and extracting from them nutritious substances. In this animal the processes of nutrition, sensation, motion, and reproduction are all performed by a single cell. Its power of sensation is such that it keeps in water of a medium temperature, and moves from the source of light and objects that endanger it. These characteristics have caused it to be selected as the subject of treatises on biological subjects. It is found in pools of water and swamps, and usually clings to some object, such as dead leaves and weeds.

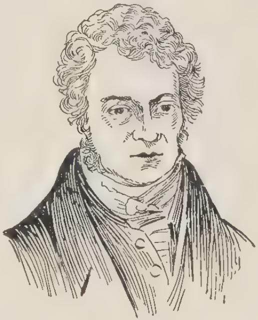
AMNESTY (ăm′nĕs-tȳ), an act of pardon, the effect of which is that persons guilty of political offenses will not be called upon to answer for them. The amnesty may be either *absolute* or *qualified.* An instance of the latter may be found in the proclamation issued by Napoleon on his return from Elba in 1815, in which amnesty was declared for the benefit of all except thirteen persons, whom he named. Only five amnesties have been issued in the United States. These were all relative to the Civil War, the first by Lincoln and the remaining four by Johnson.

AMORITES (ăm′ō-rīts), a powerful nation of ancient Canaan, whose possessions extended on both sides of the Jordan River. The Amorites occupied the whole of Gilead and Bashan, and formed two kingdoms—the northern governed by King Og, and the southern by King Sihon. The former is spoken of as King of Bashan, and the latter as King of the Amorites. They were conquered by the Israelites, after the death of Moses, under the leadership of Joshua.

AMOS (ā′mos), a contemporary of Isaiah and one of the minor Hebrew prophets. He originally lived at Tekoa, a town about 12 miles from Jerusalem, where he was a herdsman and a gatherer of sycamore fruit. It is thought that he prophesied about 785 B. C. He denounced in eloquent terms the prevalent corruption and oppression, using experiences in pastoral life to impress the force of purity and freedom in right living. Modern critics assert that many additions and changes were made in his writings several centuries after his death.

AMOY (ȧ-moi′), a city in China, on an island of the same name, in the province of Fukien. It is located on the strait of Formosa, near the mouth of the Pei-chi or Dragon River, and ranks as one of the chief seaports on the Pacific, having long been an open port. The harbor is large and deep. It has a growing trade in tea, opium, paper, cotton, and earthenware. Deposits of coal abound in the vicinity. Population, 1922, 115,862.

AMPÈRE (ŏn-pêr′), **André Marie**, mathematician and physicist, born in Lyons, France, Jan. 20, 1775; died in Marseilles, June 10, 1836. He became devoted to mathematics at an early age, and was a student of Latin and the natural sciences. In 1814 he was elected a member of the Academy of Sciences, and for many years was inspector general of the Paris University, and professor of mathematical analysis in the Polytechnic School. He began to devote much attention to the phenomena of electro-magnetism in 1820, and published a number of works profound in thought and extraordinary in philosophic sagacity. His greatest work, "Classification of the Sciences," was written shortly before his death. The ampere, the practical unit of electrical current, was named on account of his discoveries.



ANDRÉ M. AMPERE.

AMPHIBIA (ăm-fĭb′ĭ-ȧ), the term used to designate a class of vertebrate animals which can live for a considerable time either on land or in water, and which for one part of their existence live in water and at another on land. They include two classes, the tailed, containing newts and salamanders, and the tailless, embracing frogs and toads. In the larval stage they possess gills, and some species, when fully developed, are able to breathe either by the gills or the lungs, and many retain the gills throughout life.

AMPHION (ăm-fī'ŭn), the son of Zeus and Antiope, twin brother of Zethus, and husband of Niobe. He became skilled in music by the gift of the gods, and when sent to build the walls of Thebes he attracted the stones by the sound of his lyre so they moved and arranged themselves in the proper position without human aid. Zethus, his brother, was a shepherd.

AMPHITHEATER (ăm-fĭ-thē'á-tẽr), or **Colosseum,** a spacious building, usually oval shaped, used by the Romans for gladiatorial contests, wild beast fights, and other spectacles. The largest of these structures was the Flavian, known as the Colosseum, which was begun by Vespasian and finished by Titus in the year 80 A. D., ten years after the destruction of Jerusalem. This structure is now in a better state of preservation than any other. It covers five acres of ground, and had a capacity sufficient to seat 87,000 persons. The length is 612 feet and the breadth is 515 feet. Titus dedicated it by a celebration lasting a hundred days, during which time 5,000 wild beasts were slain. Many of the amphitheaters were used as castles and for fortifications in the Middle Ages. In modern times the name came to be applied to any oval or circular building with tiers of seats overlooking an arena or a central space.

AMPUTATION (ăm-pû-tā'shŭn), in surgery, the removal of any part of the body or limbs on account of disease or injury. An operation of this kind is advisable in cases of serious accidents and diseases, in which life would be endangered if the part were allowed to remain, especially in such diseases as gangrene and malignant growths. Amputations are either *flap* or *circular* with reference to the manner in which the flesh is cut. In the former the flesh is cut in a slanting direction to the bone so as to leave one or more flaps to cover amply the end of the stump, and in the latter the skin and superficial fascia are divided by the knife around the limb, loosening the skin about three inches, then dividing the muscles and using sufficient to cover the bone. The flesh is removed before the saw is applied. Most surgeons consider an amputation at the joints more serious than in the continuity of the limbs, while an operation at the hip joint and near the vital organs of the trunk need a skillful operator and are attended with considerable danger. Amputations were practiced by the ancient, but a great many deaths resulted because practitioners did not understand the methods of preventing infection, severe bleeding, and blood poisoning.

AMRITSAR (ŭm-rĭt'sŭr), a city of India, in the Punjab, 40 miles east of Lahore. It is the capital of a district of the same name and the center of the Sikh religion and learning. An extensive commercial trade is carried on with Central Asia. The chief manufactures are shawls and silks. It is at the junction of several railroads and the seat of a number of schools, a dispensary, and the marble Darbar Sahib, the chief temple of the Sikh faith. Population, 1921, 162,548.

AMSTERDAM (ăm'stẽr-dăm), a city of New York, in Montgomery County, on the Mohawk River, thirty-two miles northwest of Albany. It is on the Erie Canal and on the West Shore and the New York Central railroads. It is surrounded by a fertile region, and has an extensive trade in general merchandise. The chief manufactures are carpets, buttons, brooms, hardware, vehicles, hosiery, and clothing. The streets are substantially paved with stone and macadam. It has electric street railways, waterworks, sewerage, a public library, and other facilities. It is the seat of a fine public school system, several private educational institutions, and a number of excellent church buildings. The first settlement in its vicinity was made in 1778, when it became known as Veedersburg, and it was incorporated under its present name in 1830. Population, 1905, 23,943; in 1925, 35,260.

AMSTERDAM, one of the chief commercial cities of Europe, capital of Holland and of the province of North Holland, and the metropolis of the Netherlands. It is situated on an inlet of the Zuyder Zee, ten miles east of Haarlem, and is the converging center of many important railroads. Owing to the low and marshy condition of the site, the greater part of the city is built on piles driven deep into the ground. It is protected by dikes against the tides that rise higher than the level of the city. A system of canals divides it into about ninety islands, which are connected by nearly 300 bridges.

The city has many excellent and substantial structures, among them the government palace building, erected in 1648. It contains many fine churches, a majority belonging to the Dutch Reformed Church, but the inhabitants include a considerable number of Lutherans, Catholics, and Jews. It is a noted educational center, being the seat of a thoroughly organized public school system, numerous colleges and academies, hospitals, and other public institutions. The chief manufactures are clothing, pottery, lumber products, sailing vessels, glassware, books and printed matter, engines, and machinery. A majority of the inhabitants engage in manufacturing and commercial enterprises. Amsterdam dates from the 13th century, when it was a small fishing village. It is now one of the leading commercial centers of Europe. Population, 1926, 726,527.

AMU, or Amu-Darya, See **Oxus.**

AMUCK (ȧ-mŭk′), or **Amok,** a custom practiced in Java and other islands of the Malay Archipeligo by natives who have become ferocious through the excessive use of opium. Maddened by the effect of the poison, the crazed victim of the opium habit rushes to the street with a dirk knife and seeks to stab those who may come in his way. On being seen in this condition, the cry of *amuck* causes the people to capture and kill the madman.

AMUNDSEN, Roald, explorer, born at Borje, Norway, July 16, 1872; died about June 20, 1928. As a young man he had much ability as an athlete, as well as aptitude for his studies. After attending the University of Oslo, he became a seaman. In 1903 he undertook a voyage of discovery in the Arctic regions, which resulted in the discovery of the Northwest Passage between the Atlantic and Pacific, and in 1911 he discovered the South Pole, where he planted the flag of Norway. In 1926 he flew over the North Pole in company with Lincoln Ellsworth of America and Umberto Nobile of Italy. He went on a mission to rescue the *Italia,* in 1928, and was lost at sea.

AMUR (ä-mo͞or′), or **Amoor,** an important river of Asia, one of the great streams of the world, formed by the junction of the Shilka and Argun rivers. It has a basin covering an area of 796,000 square miles, and its estimated length is 2,739 miles. The Amur forms a part of the boundary between Siberia and China, penetrates the Khingan Mountains, and flows into the Sea of Okhotsk, through the Gulf of Amur. Among its chief tributaries are the Sungari, the Ussuri, the Seya, and the Bureya.

ANABAPTISTS (ăn-ȧ-băp′tĭsts), a name sometimes applied to the denominations of Christians that deny the validity of infant baptism, but more properly used to designate a peculiar sect that laid claim to supernatural power. This sect was founded in 1517, under the leadership of Thomas Munzer, at Zwickau, Germany. They took part in the Peasants' War but were defeated near Muhlhausen in 1525. Munster, in Westphalia, became their center of influence in 1533, where they were defeated by a military force sent against them on a charge alleging that they practiced gross immoralities. This sect differed in many points of doctrine from the Baptists, but, like the latter, protested against infant baptism.

ANABASIS (ȧ-năb′ȧ-sĭs), the title of two Greek historical works. The "Anabasis of Cyrus" was written by Xenophon in the 4th century B. C., and in it is an account of the expedition of the younger Cyrus against his brother, King Artaxerxes of Persia, and of the retreat of the 10,000 Greeks. The other, known as the "Anabasis of Alexander," is the account of the campaigns of Alexander the Great, written by Arrian in 168 A. D.

ANACONDA (ăn-a-kŏn′da), a large serpent of the boa family, native to tropical America, but found chiefly in Brazil and Guiana. There are different well-known species, the typical form attaining a length of about thirty feet, but those usually seen in museums are not over twenty feet long. The eyes are small, the mouth is perfectly straight, the teeth are strong, and the color is blackish green above and yellowish below. These serpents feed on fish, small rodents, monkeys, and other animals, which they crush in their strong folds and usually swallow whole or only partly masticated. They are found mostly along the shores of lakes and streams. Their skins are used for making bags and shoes by the natives, who utilize their flesh as food.

ANACONDA, a city of Montana, in Deer Lodge county, about sixty miles southwest of Helena, on the Great Northern, the Northern Pacific, and other railways. It has a free library of 8,500 volumes, several fine school buildings, and good municipal improvements. The surrounding country contains valuable deposits of gold and silver, a circumstance that occasioned the rapid growth of the city. The manufactures are machinery, earthenware, clothing, brick, and smelter and machine shop products. It has a growing trade in merchandise, produce, and minerals. Anaconda has had a rapid growth since 1884, when the copper reduction works were established. Population, 1900, 9,453; in 1910, 10,134; in 1920, 11,668.

ANACREON (ȧ-năk′rē-ŏn), a Greek lyric poet, born at Teos, a seaport of Ionia, in 561 B. C.; died in 476 B. C. He passed a number of years at the court of Polycrates of Samos, and after the death of the latter he resided at Athens. He was a prolific writer, though only two of his poems are known to exist in complete form. A statue was erected to his honor at Athens and the city of Teos placed his likeness on its coin.

ANAEMIA (ȧ-nē′mĭ-ȧ), the name applied to a morbid condition of the system produced by various causes, especially by a loss of blood and a deprivation of light and air in mines. A person afflicted with anaemia is characterized by great paleness and usually the blood vessels are easily traceable. The patient should have fresh air and good nourishment, especially such materials as tend to restore the vigor of the blood, including iron and arsenic treatment.

ANAESTHETICS (ăn-ĕs-thĕt′ĭks), a class of medicines used as drugs or inhaled in the form of vapor, which destroy consciousness for a time and with it the sense of pain. The value of such agencies was known to the ancients, but the scientific application dates from 1800, when Sir Humphry Davy recommended them for use in surgery. Homer and Herodotus mentioned the effects of nepenthe when used in surgery, and it is spoken of in that respect by Pliny, while various Chinese manuscripts allude to the use of a preparation of hemp for the same purpose. Faraday established the use of sulphuric acid in 1818, and Simpson in 1847 announced the value of chloroform, which has since been used as the chief anaesthetic agent. A solution of cocaine is injected by some practitioners to secure anaesthesia in certain parts of the body, a practice originated by August Bier, of Kiel, Germany. By this method the patient may witness in a conscious state the operation performed, as the amputation of a leg or arm, but this is not possible when the operation is in the trunk. A new anaesthetic known as *stovaine* was discovered by M. Fourneau, a French surgeon, in 1907, which is used in a similar way to produce paralysis of the body below the point of injection and removes all sensation from the limbs. With it properly administered it was found possible to amputate a limb while the patient retained consciousness, and, had he been allowed to do so, could have even witnessed the operation. Stovaine is a compound in the nature of cocaine.

ANAGRAM (ăn'à-grăm), the transposition of the letters forming a word or sentence into a new word or sentence. The ancients constructed anagrams of divers words, often applying to the newly formed words a prophetic meaning. A true anagram is formed by transposing every letter in the original word and adding no new or different letter. For instance, the letters of Des Moines (Iowa) have been transposed and the name Seni Om Sed originated, which is applied to an autumnal festival given in that city.

ANAKIM (ăn'à-kĭm), a race of giants who lived in the southern part of Palestine at the time of the exodus of the Israelites. They are referred to as "the children of Anak," and settlements were made by them in the mountains of Judah and Israel. Joshua conquered them and destroyed many of their cities, but a remnant of them survived in Gath, Gaza, and Ashdod.

ANALOGY (à-năl'ô-jĭ), a word used to express relation or close resemblance. It is used in grammar to express conformity with the structure of a language; in biology, to denote parts which agree in functions; and in mathematics, to designate similitudes of ratio.

ANALYSIS (à-năl'ĭ-sĭs), the process of resolving a whole into its parts, and opposed to synthesis, by which parts are combined to form wholes. The term *analysis* is applied in many branches of study, especially in chemistry, mathematics, and physics.

ANALYTICAL GEOMETRY. See **Geometry.**

ANAM (å-nâm'), or **Annam**, a country of Asia, situated south of China, east of Siam, and west of the South China Sea. Southwest of it is the Gulf of Siam. The drainage is chiefly by the Mekong River, which forms a part of the boundary between it and Siam, and flows through the southern portion. It embraces the once separated states of Tonquin and Cochin-China, and includes the ancient kingdom of Cambodia. At present it is divided into three parts: Tonquin in the north, the country of the Laos southwest of Tonquin, and nearly the whole of Cochin-China; a portion of the latter has belonged to France since 1867. The area comprises 170,100 square miles. In the north and south are rich alluvial plains, while the interior is more or less diversified by mountain ranges, and the coastal regions are generally fertile. There are extensive deposits of iron, copper, silver, gold, manganese, and coal. The commercial products take rank among the best of Southern Asia, and include cereals, live stock, fruits, tobacco, and fish. Anam is governed as an absolute monarchy, though it is largely dependent on France. In 1872 it was recognized as independent of China by the French, on condition that the king allow the free exercise of religion, open divers ports to foreign vessels, and grant special commercial advantage to France. The French claimed a violation of the treaty of 1872 and occupied Tonquin by a military force in 1883, which resulted in placing the country practically under a French protectorate. Buddhism and Confucianism are the chief religions, but a number of the inhabitants profess Christianity. Hue and Saigon are the chief seaport cities. The population of Anam aggregates 18,125,000.

ANARCHY (ăn'är-chȳ), a theory of political science, which is based upon the principle that each individual is entitled to freedom from civil authority, and that he of right possesses liberty of action in social and economic matters. The theory of anarchism developed in the 19th century, having its most eminent advocate in Jean Proudhon, a distinguished French jurist. It seeks to abolish all systems of law and government, and gives to the individual the largest freedom in society. While it may be considered as an ethical ideal of social relations, the application of its principles, though only individual or local, have resulted in harm and disaster. If the tendencies of men were pure and unselfish, and there were a standard of right both correct in itself and accepted and practiced by all individuals, it might be possible to successfully build a state or nation upon its tenets, but in practice it has led to revolution and terrorism. Many adherents, though at first pure and sincere in the belief, became contaminated with thoughts of destruction and assassination that have placed anarchy in the category of lawlessness.

No doubt the aristocratic and absolute governments of Europe have tended to increase the adherents of this political and social dogma, and as a natural result a large number of anarchists have emigrated to America. Paterson,

N. J., has long been noted for the number of anarchists who settled in that city, and there are also many adherents in Chicago and New York. From these cities as centers of influence, literature in the form of circulars and periodicals has been sent broadcast, and efforts to secure adherents have been made through personal solicitations and public meetings. In 1896 disturbances occurred in Chicago in which a number of anarchists took part, and three assassinations in this country are charged to perpetrators who were supporters of anarchism —the assassination of Lincoln in 1865, Garfield in 1881, and McKinley in 1901.

The most prominent agitators and advocates of anarchism in the United States were Johann Most and Emma Goldman, both of whom were convicted under the laws of New York for directly inciting crime. The assassinations of M. von Plehve of Finland and Grand Duke Sergius in Moscow, in 1905, are chargeable more or less directly to anarchists stimulated by the feeling of unrest and revolution in Russia. No doubt the evil results incident to a general spread of its supporters can be lessened by federal legislation, which would operate to limit writing and speechmaking designed to extend its influence. An anti-anarchist conference was held in Austria in 1898, owing to the assassination of the empress, and at this time there is a movement in the leading nations to curtail, if not eradicate, the spread of anarchistic influences.

ANATOMY (ȧ-năt′ṓ-my̆), the science that treats of the form and structure of organic bodies, and shows their distinct formation, and the relation of each part to the other parts of such bodies. It implies the cutting up or dissecting, and is generally understood to apply to to the human body, while the anatomy of animals is known as zoötomy, and that of plants as phytotomy. Hippocrates is held to be the father of medicine, but, since his views of the structure of the human body were superficial, he is not regarded the father of anatomy. Aristotle based his views on the dissection of animals, and is regarded the founder of the science. Human bodies were not dissected until 250 B. C., when it became common to dissect the bodies of criminals. Celsus wrote much on anatomy, and after his time many discoveries were made by the dissecting of apes and the bodies of other animals. For centuries a popular prejudice existed against allowing the body of a relative or a corpse of any kind to be dissected, which long retarded the progress of this highly important and useful department of knowledge. Many investigators were obliged to limit their dissections to the dead bodies of the lower animals, drawing analogies thence to the human frame, instead of directly studying the corpses of mankind.

Superstition retarded progress in the study of anatomy for many centuries, and scientists who announced new and valuable discoveries were either ruined in their attempts to develop useful results from them, or were burned at the stake. The circulation of the blood was not known to the ancients and was discovered by Harvey in 1619, who for years hesitated to announce this valuable addition to human knowledge, but when he made his discovery known popular disapproval ruined his medical practice. Discoveries made in the 18th and 19th centuries are numerous, and have greatly extended knowledge in the practice of surgery and medicine. The adoption of improved methods of practice so revolutionized the external and internal treatment of the human body that the average of human life has been prolonged at least several years.

Anatomy as a science has become so systematized that it has been divided into several departments, which are studied with the view of fitting practitioners for special lines of practice. The surgeon is required to understand the relation of the different organs to each other that he may know how and where to apply his instrument in operating on the living body, while the physician must necessarily understand the structure of all parts that he may successfully administer medicines to affect the different organisms in the most beneficial way. The study of the bones of the skeleton, muscles, nerves, skin, digestive system, and other systems of the body is called descriptive anatomy. Investigations of the special organs, as the coats of the stomach and the cells of the lungs, is termed general anatomy. Study relating to the tissue cells and atoms by the use of the microscope is known as microscopical anatomy.

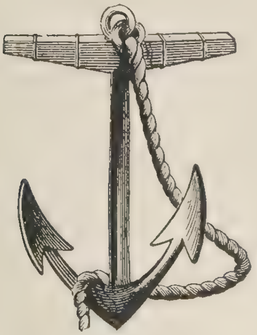
For convenience in the study of anatomy, the body is considered from the standpoint of its principal parts. These include the skeleton, constituted of the bones, joints, and cartilaginous formations; the muscular system; the skin; the nervous system, including the ganglia, nerves, spinal cord, and brain; the throat and mouth; the vocal organs; and the organs constituting the seat of the senses—the ear, the eye, the nose, the mouth, and the papillae. To the digestive system, which includes the alimentary canal, the muscular membranous tube into which food is taken to be digested while undergoing its more or less complicated course through the body, and which is constituted of the mouth, aesophagus, stomach, and intestines, belong the accessory organs, including the salivary glands, the pancreas, and the liver. The organs of circulation include the capillaries, the arteries, the veins, and the heart, while to the organs of respiration belong the throat, the windpipe, and the lungs. Other principal parts include the kidneys, the organs of reproduction, and the lymphatic system, with its vesicles and glands. See **Heart, Ear, Eye, Skin,** etc.

ANAXAGORAS (an-aks-ăg′o-ras), eminent Greek philosopher, born in Ionia about 500 B. C.; died in 428. He was so highly imbued with a love of meditation and philosophy that he rejected wealth and political honors, and spent much time in Athens with Pericles. Writers consider him the first Greek philosopher to conceive God as a divine mind. He announced the theory of the minute constituents of things, which he assigned to the Supreme Intelligence that he thought exists in man, and by his teaching paved the way for the atomic theory. Though a diligent writer, only fragments of his works have come down to us.

ANAXIMANDER (an-aks-ĭ-măn'der), Greek mathematician and philosopher, born at Miletus in 610 B. C.; died about 547. Writers attribute many inventions to him, among them several relating to astronomy and geography, the most valuable of which were his geographical maps. He was the discoverer of the astronomical fact that the ecliptic is oblique. According to his view, the earth is the center of the universe and the sun is twenty-eight times as large as our planet. Some writers regard him the inventor of the sundial.

ANAXIMENES (an-ax-ĭm'e-nez), philosopher, born at Miletus, in Asia Minor, and flourished about 550 B. C. He taught that the air is the essence of all things, animated with a divine principle, and the origin of all beings. The sun and planets he supposed to be flat like a tablet and resting on air.

ANCHOR (ăn'kẽr), in navigation, an implement for retaining a ship at a particular place by temporarily chaining it to the bed of the sea or river, which is called an anchorage. In early times bags of sand, large stones or wooden anchors weighted with lead were commonly employed for this purpose. Iron anchors were first used by the Greeks, and their manufacture was one of the most laborious industries, this being due to the fact that very large hammers are required to weld and shape the materials. In modern times the steam hammer came into almost exclusive use for this purpose. It is a powerful implement, having an enormous force, and is easily applied in comparison to the sledge hammers wielded by men. Anchor-making is now conducted on a large scale, and the occupation of an anchorsmith is considered an important one. Ships that have a tonnage of 1,000 tons usually require anchors weighing thirty cwt.; those having a tonnage of 3,000 require an anchor weighing thirty-five cwt., and others in like proportion. Most vessels carry from two to ten anchors, this depending on the size of the ships and the routes to be sailed.



ANCHOR.

ANCHOVY (ăn-chō'vȳ), a small fish common in the Mediterranean Sea and the Atlantic shores of Europe. It belongs to the herring family, but is somewhat thicker, has a pointed head, a projecting upper jaw, and is esteemed for its fine flavor. It is caught in seines and used extensively for sauces and pastes. Several species of anchovy are found off the coasts of Canada and the United States, both in the Atlantic and the Pacific.

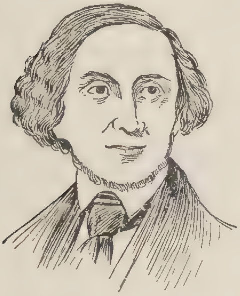
ANCIENT ORDER OF UNITED WORKMEN, a fraternal, mutual benefit association organized in 1868 by John J. Upchurch at Meadville, Penn. There are limited restrictions of occupation and its aims and purposes are purely benevolent. Three degrees are recognized in the order, each having its appropriate grips, signs, and symbols. The association has forty grand or State lodges, about 5,000 subordinate lodges, and a membership of 410,000 in the United States. Since its organization it has paid annually an average of about $3,000,000 as benefits to members, but the disbursements at present aggregate $7,500,000 per year. The supreme officers are elected annually in the supreme lodge, which is constituted of delegates sent by grand lodges, and the latter in turn are made up of delegates from subordinate lodges.

ANCONA (ȧn-kō'nȧ), an important seaport city in Italy, capital of a province of the same name, about 130 miles northeast of Rome. It is built in the form of an amphitheater on the slope of two hills rising from the shores of the Adriatic, has railroad facilities, and carries considerable export and import trade. The manufactures are paper, woolen and cotton textiles, musical instruments, silk hats, and machinery. The city abounds with fine statuary, among which is a colossal statue of Count Cavour. In the harbor is a mole 200 feet long built by Emperor Trajan, on which is the famous triumphal Arch of Trajan. Ancona was founded in the 4th century B. C., by refugees from Syracuse, but became a Roman colony in the 3d century B. C. It has belonged to Italy since 1860. Population, 1922, 64,452.

ANDALUSIA (ăn-dȧ-lōō'shĭ-ȧ), a region in the southern part of Spain. It was part of the Roman province of Baetica, is a fertile district, and comprises an area of 33,663 square miles. Along the northern border extend the Sierra Morina Mountains, and the southern part is traversed by the Sierra Nevada. The Guadalquivir is the largest river and has a southwesterly course to the Atlantic. Fruit, grain, wool, cotton, and wine are the chief products. Copper and iron mining is carried on extensively. The Andalusian breed of horses has long been famous. For the purpose of government it is divided into the eight provinces of Almería, Cadiz, Cordova, Granada, Hulelva, Jaen, Málaga, and Sevilla. The language spoken is Spanish with a slight mixture of Arabic. Population, 1921, 3,562,650.

ANDAMANS (ăn-dȧ-mănz'), a group of small islands in the Bay of Bengal, politically attached to British India. These islands have an area of 2,508 square miles, are well timbered, and by the Duncan Passage are divided into the Great and Little Andamans. The natives are of small stature and engage chiefly in fishing and the manufacture of clothing and utensils. Since 1858 the islands have been used as a penal settlement of India. The government is under a commissioner resident at Port Blair. Population, 1921, 18,190.

ANDERSEN (ăn'dẽr-sĕn), **Hans Christian,** eminent author, born in Odense, Denmark, April 2, 1805; died in Copenhagen, Aug. 6, 1875. His father was a shoemaker in very moderate circumstances, but possessed a literary taste. He learned the occupation of his father in the shoe shop, attended a charity school, and made many personal friends by his skill and talent in singing. In 1819 he was permitted to go to Copenhagen to witness the performance of a play, where he secured an engagement as a theatrical singer, but was very soon discharged on account of a lack of education. Though he made heroic efforts to cultivate ability as a stage singer, he soon found himself unfitted on account of having neither a graceful face nor pleasing manners. Through the influence of a friend he was admitted to one of the government schools, which enabled him to acquire an education, and thus came the turning point of his life. In 1829 he published his first volume of poems, which was received with much enthusiasm, and a second volume appeared in 1831. These proved so popular that he was granted a traveling pension by the King of Denmark in 1833, and thereby obtained opportunities for mental development. Accordingly, he visited the historic places of Southern Europe, and at the same time wrote poetry and descriptive prose of the points of interest with which he came in contact. His works have been translated into the different languages of Europe as well as many of the Asiatic languages, and are still extensively read in Eurasia and America. They are particularly popular among the young on account of the pleasing manner and clear language in which they are written. Andersen was an admirable public reader of his own works. The most important of his writings embrace "Dying Child," "Walk of Amak," "Traveling Sketches," "Story of My Life," "Tales from Jutland," "Travels in the Hartz Mountains," "New Fairy Tales," and "Tales for Children." On his seventieth birthday he was presented with a book containing one of his fairy tales in fifteen different languages.


HANS C. ANDERSEN.

ANDERSON (ăn'dẽr-son), a city of Indiana, county seat of Madison County, thirty-five miles northeast of Indianapolis, on the Cleveland, Cincinnati, Chicago and Saint Louis and other railways. It occupies a fine site on the west fork of the White River. The surrounding country is rich in farm produce and deposits of coal and natural gas. It has electric street railways, pavements, waterworks, electric lights, and several libraries. Among its chief buildings are a number of excellent schools, the county courthouse, numerous churches, and many excellent business blocks. The manufactures include machinery, clothing, cigars, earthenware, and farming implements. The first settlement at Anderson was made in 1823 and it was incorporated in 1865. Population, 1920, 29,767.

ANDERSON, a city of South Carolina, county seat of Anderson County, 125 miles northwest of Columbia, on the Southern and other railroads. The surrounding country is fertile. It has manufactures of textiles, hosiery, machinery, and implements. The city has several fine public buildings and modern municipal facilities. Electric power is obtained from a station on the Seneca River, about ten miles distant. In 1827 the first settlement was made in the vicinity. Population, 1920, 10,535.

ANDERSON, Mary. See **Navarro.**

ANDERSON, Rasmus Bjorn, author and educator, born in Albion, Wis., Jan. 12, 1846. He descended from Scandinavian parents, studied at several institutions in Iowa, and was for some time professor of Scandinavian languages at the University of Wisconsin. His literary works include several histories and a treatise on the folklore of the Norsemen. President Cleveland appointed him United States minister to Denmark in 1885, in which position he served four years. His chief works include "Norse Mythology," "The Younger Edda," "Viking Tales of the North," and "America Not Discovered by Columbus."

ANDERSON, Robert, soldier, born near Louisville, Ky., June 14, 1805; died Oct. 27, 1871. He was a graduate from the United States Military Academy, served in the Black Hawk War, and later became instructor of artillery at West Point. In 1838 he was made general of the staff of Winfield Scott and served in the Mexican War, distinguishing himself in the Battle of Molino del Rey. He rendered valuable services in the Civil War, particularly at Forts Moultrie and Sumter, receiving the thanks of Congress. He retired from active service in 1863 on account of poor health. In 1868 he went to Europe, where he translated several military books from the French and adapted them to the American service. His death occurred in Nice, France.

ANDERSONVILLE, a village in Sumter County, Georgia, sixty-two miles southwest of Macon. It is famous as the site of a Confederate prison from 1864 to the close of the war. The total number of prisoners received at the place aggregated 49,485, of whom 12,926 died from lack of food and sanitation. The superintendent, Henry Wirtz, was tried on a charge of mismanagement, found guilty, and hanged on Nov. 10, 1865. A national cemetery now occupies the site of the prison. In 1920 the village had a population of 174.

ANDERSSON (än'dẽrs-son), **Nils Johan,** botanist, born in Småland, Sweden, Feb. 20, 1821; died March 27, 1880. He studied in Stockholm and Upsala, and in 1851-53 accompanied a Swedish expedition around the world. On returning to Sweden, he wrote a description of the journey, entitled "A Voyage Round the World." In 1856 he was chosen professor of botany in the Academy of Sciences, Stockholm, where he won many friends by close application to scientific research.

ANDES (ăn'dē̇z), the predominating mountain system of South America, extending from near the island of Trinidad across the northern part of the grand division, thence in a direction nearly parallel to the Pacific, and continuing almost to the Strait of Magellan. It is composed of two approximately parallel chains, between which are located wide and comparatively fertile valleys. On the north they are separated into three chains, in the center mainly into two, and in the south they unite into one. The chains are connected by transverse ridges, forming numerous mountain knots. The system forms a continuation of the Cordilleras of North America, from which it is separated by wide depressions at the Isthmus of Panama. From this point the elevations increase in height toward the south, reaching their highest point in Chile, where they culminate in the volcanic peak of Aconcagua, 23,910 feet, which is the highest elevation. The average height of the Andes is about 12,000 feet, and the system is from forty to 350 miles wide. The total area covered by the base of the system is more than a million square miles.

The Andean mountain system includes numerous tablelands, the most important being the plateau of Quito, 9,543 feet; the plateau of Casco, in North Peru, 11,000 feet; and the plateau of Bolivia, 13,000 feet. From most of these higher plateaus rise volcanic peaks, which, together with the volcanoes located in the mountain ranges, include from forty to sixty still active the greater part of the year. The system is the most compact of the great mountain systems of the world, and hundreds of the peaks tower to immense heights; at least ten of them exceed a height of 20,000 feet. The system contains the source of all the great rivers of South America, except the main source of the La Plata, the Tocantins, and the Sáo Francisco, which rise in the highlands of Brazil. In the northern portion the Orinoco dashes its waters toward the island of Trinidad, from the center flow a large number of the sources of the Amazon, which discharges great volumes of water into the Alantic Ocean under the equator, while farther south some of the sources of the La Plata and the Colorado carry their waters toward the south and east. In the center of the system, on the high elevation between Peru and Bolivia, is located the wonderful inland lake Titicaca, 12,847 feet above the level of the sea, which has no outlet to the ocean, and is perhaps the only inland fresh-water lake. Its surface area is 3,800 square miles. The countries that include parts of the Andean mountain system are Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina. Between their elevations are many fertile valleys and plains, notably among them the plain of Cuzco, which, under the burning sun of the tropics, has the climate and productions of the temperate zone. In the territory occupied largely by Peru reigned the ancient Incas, who attained a high state of semicivilization and whose works are still attested by gigantic ruins and wonderful cemeteries. Here were constructed great highways for travel, which crossed summits of the lofty peaks or passed through them by tunnels and in their course they extended over cañons and rivers by works of solid masonry. Peru and Chile still retain the highest conditions of civilization that have developed in South America.

The plant and animal life of the Andean system differs widely from that of the eastern portions of South America. Among the wild animal forms are the alpaca, llama, jaguar, puma, and the fleet deer. Bird life is especially rich with song and plumage, and includes the great condor, besides hundreds of varieties of smaller birds peculiar to the different altitudes. This highland region has extremely rich deposits of minerals, such as iron, lead, platinum, copper, coal, petroleum, silver, and gold. These yield large profits where the apparently indifferent inhabitants of the southern continent have put forth an effort to develop mining. Many cities located in the Andes are at a great elevation, and consequently enjoy a perpetual season of cool and bracing atmosphere. Chief among these are Cerre de Pasco, Potosi, and Quito, the historic capital of Ecuador.

ANDORRA (ȧn-dŏr'rȧ), a republic of Europe, Eastern Pyrenees, between the Spanish province of Lérida and the French department of Ariège. The area is 175 square miles, divided for the purpose of government into six parishes.

It is surrounded by high mountains, is rich in iron and lead deposits, has some forests, and agriculture and manufacturing are the chief enterprises. Dairying and fruit culture receive careful attention. Charlemagne made Andorra an independent state because its inhabitants had rendered services to him while he was conducting an expedition against the Moors, and its autonomy has been preserved until the present. It is governed by a council of twenty-four, elected for four years, and the laws are administered by two judges, one chosen by the Bishop of Urgel in Spain and the other by France. Andorra, the capital, has a population of 1,000 and is the chief town. The population of the republic is 5,231.

ANDOVER (ăn'dō-ver), a town of Essex County, Mass., on the Merrimac River, twenty miles north of Boston, on the Boston and Maine Railroad. It is the seat of Phillips Academy, an institution for boys founded in 1778, and of the Abbott Academy for girls. The recent growth of Andover is due largely to the American Woolen Company, which operates a large plant here. Andover has excellent public schools, is connected with other towns by electric car lines, and is substantially improved by modern facilities. The manufactures include clothing, textiles, earthenware, and machinery. Andover was first settled in 1643 and was incorporated three years later. Population, 1905, 6,632; in 1925, 10,291.

ANDRASSY (ŏn'drä-shē), **Julius, Count,** born in Zemplin, Hungary, March 8, 1823; died Feb. 18, 1890. He descended from an ancient and noble family, who possessed vast estates in Hungary in the 16th century. His father, Charles Andrassy, was an influential member of the national diet. The son received a liberal education, became a leader in the Revolution of 1848, and was an exile in France and England until 1857, when he was pardoned by amnesty. On returning to Hungary, he immediately reëntered the field of politics, and in 1866 was chosen prime minister of the parliament for Hungary. He became a foreign minister of the Austro-Hungarian Empire in 1871, in which position he took an active part in promoting the *Dreikaiserbund,* a treaty between Austria, Germany, and Russia. In 1878 he represented Austria in the conference of Berlin.

ANDRE (än'drå), **John,** soldier, born of Swiss parents in London, England, in 1751; executed at Tappan, N. Y., Oct. 2, 1780. He came to America in 1774, and, owing to his amiable disposition, became a favorite in society both in Philadelphia and New York, where he was stationed at different times for military duty as a British officer. Subsequently he became aid-de-camp to Sir Henry Clinton, and in 1779 was promoted to the rank of major. The following year he began to plot with Gen. Benedict Arnold, the object of which was the betrayal of the American cause to the British. Arnold was in command at West Point, then the best fortified and most important position of the Americans. He agreed to give this position into the possession of the British in consideration of a monetary payment and other advantages, and, to conclude his plan, desired a conference with Andre. Accordingly, Andre sailed up the Hudson and met Arnold in the woods below Stony Point. By some miscalculation Andre was left within the American lines, and, to escape, took a horse to carry him to Tarrytown, but while near that place was arrested by three men and searched, and papers containing the conditions of the betrayal of Arnold were taken from his person. He was brought to Tappan, tried as a spy, and promptly hanged. His remains were taken to England in 1821 and placed in Westminster Abbey, where a monument was erected to his memory. The sad incident of his death attracted general sympathy for him personally, since he was a universal favorite and believed to be a man of otherwise good parts. His captors were three Americans, named, respectively, Isaac Van Wart, David Williams, and John Paulding. Each received a pension of $200 per year, was voted a silver medal, and in 1853 a monument was erected to their memory on the spot where they captured Andre.

ANDREE (än'drå), **Solomon August,** scientist and aëronaut, born at Grenna, Sweden, in 1854; died in 1897. He studied at Stockholm and in 1882 joined the Swedish meteorological expedition. His successful experiments in aërial navigation induced him to attempt a flight to the North Pole, for which he devised a balloon capable of being directed by sails and guide ropes. In 1897 he made the start from Spitzbergen, accompanied by two friends, but all were lost. A reward was offered for information which would establish an intelligent record of the distance traveled or lead to the recovery of relics, but nothing definite was learned aside from several dispatches sent out by carrier pigeons a few days after the start had been made.

ANDREW (ăn'drụ), one of the 12 apostles, brother of Simon Peter, born in Bethsaida of Galilee. He was a fisherman and originally became a disciple of John the Baptist, but was among the first called by Christ, and as a disciple of Jesus is mentioned in connection with the feeding of the 5,000. No mention is made of him in the Acts of the Apostles. It is thought he preached in Greece and Scythia and that he suffered martyrdom at Patrae, in Achaia. He is the patron saint of Scotland.

ANDREW, John Albion, statesman, born in Windham, Me., May 31, 1818; died in Boston, Oct. 30, 1867. He graduated from Bowdoin College, was admitted to the Boston bar, and entered upon a successful law practice. His sympathies were in favor of the abolition of slavery, and he was elected to the Legislature in 1858 by the Antislavery party. In 1860 he advocated the election of Abraham Lincoln, became Governor of the State, serving six years, and in that capacity rendered efficient services in organizing regiments to support the Union cause. He took high rank as a speaker, his most important orations relating to the nomination of Lincoln and the perpetuity of national union.

ANDREWS, Elisha Benjamin, scholar and educator, born in Hinsdale, New Hampshire, Jan. 10, 1844. He enlisted as a Federal soldier in the Civil War, rose to the rank of second lieutenant, and lost an eye at Petersburg. In 1870 he graduated from Brown University, and, after taking a course in the Newton Theological Seminary, was ordained a Baptist minister. Subsequently he became professor at Denison University, then held the chair of economics in Brown University, later at Cornell College, and in 1889 became president of Brown University. In 1892 he served as United States delegate to the Brussels Bimetallic Conference, and soon after became superintendent of the Chicago schools. He was elected president of the University of Nebraska in 1900. His books include "Institutes of General History," "Institutes of Economics," "An Honest Dollar," "Wealth and Moral Law," "History of the Last Quarter Century in the United States," and "History of the United States in Our Own Times." He died Oct. 30, 1917.

ELISHA B. ANDREWS.

ANDREWS, Lancelot, theologian, born in London, England, Sept. 25, 1555; died Nov. 23, 1626. Queen Elizabeth appointed him dean of Westminster, and James I. selected him as one of the divines to translate the Bible. In 1605 he was made bishop of Chichester and later was transferred to the see of Ely. He was considered the most learned English theologian of his time and an orator of high reputation, and is the author of several important religious works. His chief publication is "Manual of Private Devotion and Meditation for Every Day in the Week."

ANDRIA (än′drē-ä), a city of Italy, in the province of Bari, thirty-two miles northwest of Bari. It is situated on a fertile plain, has railroad facilities, and is the center of large commercial interests. The city is the seat of several noted educational institutions, a Gothic palace, and a fine cathedral. Andria was founded by the Normans. Frederich II. built the noted Castello del Monte, located nine miles south of the city. Population, 1921, 49,569.

ANDROMACHE (ăn-drŏm′a-kē), the daughter of Eetion and wife of Hector. She was noted as the most beautiful woman of Troy, and belonged to a patriotic family. Her father and seven brothers were captured in the battle of Thebes, her husband fell in the defense of Troy, and her son met death in the Trojan War. After the fall of Troy, she became the wife of Pyrrhus and, after the death of the latter, married Helenus, brother of Hector and ruler of a part of Epirus.

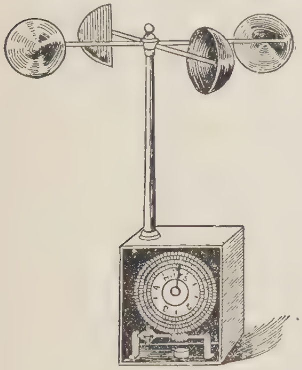
ANDRONICUS (ăn-drō-nī′kŭs), **Cyrrhestes,** Greek architect, born at Cyrrhus, in Syria. He is thought to have flourished in the 3d century B. C., though some assign him to the 1st century. His chief work was a tower constructed at Athens, known as the Tower of the Winds, on different sides of which were sculptured images and on the summit was a revolving Triton, having a wand in his right hand to indicate the point from which the wind was blowing. In the interior was a water clock, and on each of the eight sides, below the figures representing the principal winds, was a sundial.

ANDROS (ăn′drŏs), an island in the Grecian Archipelago, the most northerly of the Cyclades. It is about twenty-five miles long, ten miles wide, and has a fertile though mountainous surface. Most of the inhabitants belong to the Greek Church. Andros, the capital, has a population of 2,160. It has a large trade in wine, fruits, and merchandise. The island has a population of 19,025.

ANDROS, Sir Edmund, Colonial Governor, born in London, England, Dec. 6, 1637; died Feb. 24, 1714. His father was an officer of the royal household, where the son received a liberal education, and later became major of the dragoons under Prince Rupert. In 1674 he was commissioned Governor of New York, where he received the surrender of the Dutch, and in 1686 became Governor General of New England. His government is generally regarded harsh and intolerant, which caused him to become generally unpopular among the colonists. In 1687 he went to Hartford with a body of armed men to demand its charter, but that document was concealed in a hollow tree. The people of Boston imprisoned him and several officers in 1689, on receiving news of the revolution in England, and he was soon after sent to England by order of King William. In 1692 he was made Governor of Virginia, but was removed after six years' service.

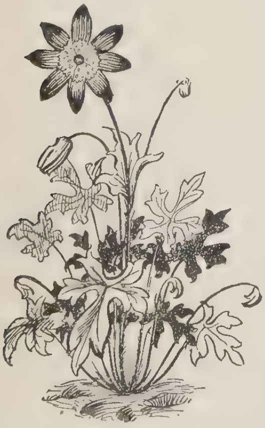
ANDROSCOGGIN (ăn-drŏs-kŏg′gĭn), a river of New Hampshire and Maine, rises in Lake Umbagog, which is situated on the border between the two states. It flows through a portion of Maine, and discharges into the Kennebec River near Bath. The total length is 156 miles.

ANEMOGRAPH (ȧ-nĕm′ȯ-grȧf), a device attached to an anemometer to make it self-recording. Most forms of this instrument have a cylinder covered by paper, which moves uniformly by clockwork, and an indicator registers at the proper time both the changes in the velocity and the direction of the wind. The paper is ruled properly before being adjusted on the cylinder. The anemograph is frequently called a wind register.



ANEMOMETER.

ANEMOMETER (ăn-ė-mŏm′ē-tẽr), an instrument for measuring the force and velocity of the wind. As ordinarily constructed, it consists of four hemispheres or cups mounted on the ends of crossed rods, on a horizontal plane, in such a manner that it may be rotated by the force of the wind. In a box below is a mechanism which records the revolutions made by a perpendicular shaft, and the indication is given by a hand moving round the dial. It has been found that the center of each cup moves with a velocity almost exactly one-third of that of the wind. Besides this contrivance, there are other instruments which serve the same purpose.



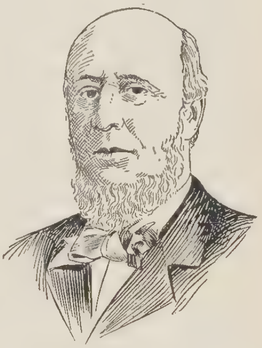
ANEMONE.

ANEMONE (ȧ-nĕm′ȯ-nē), a genus of flowering plants having truncate leaf stems, calyx corollalike, and colored petals longer than the stamens. About sixty species are cultivated on account of their profuse and beautiful flowers. The flowers are either double or single and variously colored, usually white, red, blue, yellow, or creamy violet. These flowers thrive best in a light, loamy soil. The plants are propagated by offsets, seeds, and cuttings.

ANGEL (ān′jĕl), a ministering spirit employed by God to administer comfort to men. While angels are mentioned frequently in the Bible, only two are designated by name, these being Michael and Gabriel. Tobit, a book of the Apocrypha, mentions Raphael. We have scriptural evidence that angels became visible to men (Gen. xviii. and xxxvii.), and that there were several orders of these beings, among them the seraphim, the cherubim, and the archangels. The popular belief that angels have wings is not a revealed truth, rather a poetical invention.

ANGEL, Benjamin Franklin, lawyer and diplomatist, born in Burlington, New York, Nov. 28, 1815; died in 1894. He attended public schools, was admitted to the bar, and established a successful law practice. In 1852 he was a delegate to the national Democratic convention, became consul to the Hawaiian Islands in 1853, and went on special commissions to China and Norway in 1855-56. He gave up politics in 1862 and devoted himself to agriculture, serving as president of the New York State Agricultural Society in 1873-74.

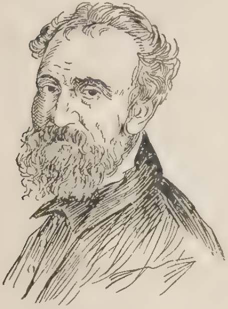
ANGELICO (ăn-jĕl′ē-ko), **Fra,** eminent painter, born in Vicchio, Italy, in 1387; died in Rome about 1455. His real name was Fra Giovanni da Fiesole. He entered the monastery at San Domenico in 1407, and afterward became devoted to painting. His works are especially popular on account of rare harmony of color, and many were made models for art productions by subsequent painters. He painted frescoes in several monasteries and churches, and produced numerous easel pictures, his best-known specimen being "Coronation of the Virgin."



JAMES B. ANGELL.

ANGELL (ān′jel), **James Burrill,** educator, born in Scituate, Rhode Island, January 7, 1829; died April 1, 1916. He graduated at Brown University in 1849, spent four years traveling in Europe, and in 1860 became editor of the Providence Daily *Journal.* In 1866 he was made president of the University of Vermont, and in 1871 was chosen to a like position in the University of Michigan. He received leave of absence in 1880 to serve as envoy extraordinary to China, and in that capacity procured a revision of the treaty between that country and the United States. President McKinley appointed him minister to Turkey in 1897. In 1909 he resigned as president. He is the author of "Progress in International Law" and "Manual of French Literature." He contributed to many periodicals, including the *North American Review.*

ANGELO (ăn′jȧ-lo), **Michael (Michaelangelo Buonarroti),** eminent painter, sculptor, and artist, born at the castle of Caprese in Tus-



MICHAEL ANGELO.

cany, Italy, March 6, 1474; died Feb. 17, 1563. He descended from parents of noble birth, who were long connected with the Florentine Republic. At school he neglected his studies for drawing, early learned the rudiments of painting, and attracted the attention of Lorenzo de Medici, a celebrated merchant prince, who opened a garden in Florence ornamented with statues. At this garden Angelo spent much time in drawing from statues and decorations, which served as fitting models for the young artist. The production that pleased the merchant most was a restoration of the mutilated head of a laughing faun, and which caused him to aid the young artist in developing his skill. He soon became distinguished in painting and sculpturing, and was commissioned to decorate the senate hall at Florence with historical designs, but before the work was completed he was called to Rome by Pope Julius II. There he painted the dome of the Sistine Chapel, his frescoes representing the principal events of sacred history, among them the creation. He sculptured seven statues for the monument of the pontiff, including one of Moses, and which are now in the church of Saint Pietro, in Vincoli. When Charles V. of Spain led a campaign against Florence in 1530, Angelo was a strong factor in its defense. Soon after he began the work of painting "The Last Judgment," at which he labored eight years. Other great works in painting include "The Conversion of Paul," and "The Crucifixion of Saint Peter," in the Pauline Chapel. Among his productions most noted in sculpture are "Bacchus," "David," and "The Descent of Christ from the Cross." In 1546 he undertook the rebuilding of Saint Peter's and designed and built the dome, but the work was not completed until after his death. By his plans this Saracenic hall was converted into an excellent and imposing place of Christian worship. He died at Rome, but his remains were removed to Florence and placed in the church of Santa Croce. His devotion to art, piety, benevolence, and liberality made him the beloved of the nation, and caused his name to shine in the history of arts with unsullied luster.

ANGELUS (ăn'jē-lŭs), a short Roman Catholic prayer, beginning with the words, "Angelus Domini nuntiavit Mariae," and recited at the ringing of the Angelus bell. It is offered in devotion to the memory of the Annunciation, at six o'clock in the morning and evening and at noon. J. F. Millet made the sound of the Angelus bell reaching the ears of a man and woman working in a field the subject of his celebrated painting, which was purchased by M. Chauchard in 1890 for $150,000.

ANGERS (än-zhā'), a city in France, capital of the department of Maine-et-Loire, sixty miles southwest of Le Mans. It has a college, a cathedral, and a library of 40,000 volumes. In the vicinity are slate quarries. Leather, silks, chemicals, clothing, and machinery are among the manufactures. Statues of J. Bodin and René of Anjou, who were born here, are in the Place du Lorraine. Population, 1922, 82,935.

ANGINA PECTORIS (ăn-jī'na pĕk'tō-rĭs), or **Heart Stroke**, an intense pain which occurs in paroxysms in the region of the heart, or extends from the lower end of the chest-bone to the left arm. It is accompanied by faintness and suffocation, and successive attacks weaken and ultimately cause death. Men are more susceptible to it than women, especially after the age of fifty years. The disease is due to a cramp of the heart muscle, or a neuralgia of the cardiac nerves.

ANGLE (ăn'g'l), a term ordinarily used to designate a figure of two straight lines emanating from one point, the vertex, as a corner of a room. In general the term is used to express the inclination of two lines to one another. Four kinds of angles are distinguished in geometry, the plane, spherical, dihedral, and polyhedral.

ANGLER (ăn̲'glẽr), a fish common to the coasts of North America and Europe, and known by the different names of monkfish, fishing frog, and goosefish. It is classed with the family of spiny-ray fishes, has a length of from three to five feet, and its mouth is very large and fringed with barbels. On the top of the head are spines which it throws out as bait to its prey, attracting the smaller fishes, on which it feeds. Several species abound on the American coast from Nova Scotia to Florida, most of which attain a length of three feet, and all have a large mouth and are very voracious.

ANGLES (ăn'gl'z), or **Angli**, an ancient German tribe that occupied the country lying northeast of the Elbe, and subsequently settled in Schleswig, between the Saxons and Jutes. In the 5th century many Angles emigrated, and with large number of Saxons and Jutes colonized portions of England and Scotland. The Germanic portion of these immigrants founded the three kingdoms of Mercia, Northumbria, and East Anglia.

ANGLESEY (ăn̲'g'l-sē), or **Anglesea**, an island and county in the Irish Sea, belonging to Wales, from which it is separated by the Menai Strait. It is seventeen miles wide and twenty miles long, and is connected by railway with the mainland, which crosses the strait by the Britannia tubular bridge. The surface is quite level and the soil productive, and much of the land is in pasture. Copper is mined quite extensively, though agriculture and stock raising are the chief enterprises. Wheat, oats, barley, and potatoes are grown. Anciently the island was inhabited by Druids, and at present the Welch language is spoken largely by the peasants. Holyhead, Beaumaris, and Amlwch are the chief towns. Population, 1921, 50,590.

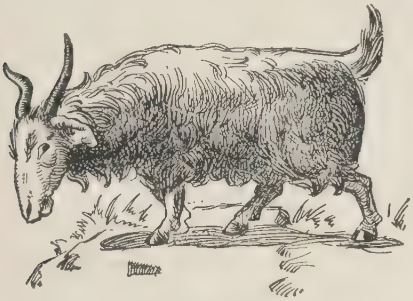
ANGLICAN CHURCH (ăn̲ʹglĭ-kan), the name applied generally to the Church of England, and sometimes used in reference to all the societies embraced in the Protestant Episcopal Church. In its strict application it refers only to the Church of England and the Protestant Episcopal Church in Scotland, Ireland, and the British Colonies. The ritual is contained in the "Book of Common Prayer," and in the Thirty-Nine Articles are laid down the doctrines of the church. As a body it is represented by its bishops from all parts of the world in the Lambeth Conference, which is held at Lambeth Palace, under the presidency of the Archbishop of Canterbury. This assembly meets at irregular intervals when called by the archbishop, usually about every ten years, and its value consists chiefly in the interchange of counsel. Its most important session was held in 1888, when it promulgated a basis for the establishment of Christian unity.

ANGLING (ăn̲ʹglĭng), the art of alluring and catching fish by means of a rod, line, and hook. The hook is furnished with a bait or lure, which is an object of prey, or the imitation of such an object. Usually the rod is about twelve to twenty feet long, the line being attached to the small end, and containing one or more hooks baited with the lure. The line is thrown into the water, in which it floats from a cork, the cork serving as an indicator of the nibbling or bite of the game. When the fish has been caught, it is drawn from the water and the line is thrown out for more game. The practice of catching fish by angling is of great antiquity. Mention is made of it by the prophet Isaiah, in Chap. xix, 8, in these words: "The fishers also shall mourn, and all those that cast angle into the brooks." The practice has prevailed throughout all ages and in all countries, and is still a favorite means for pastime and profit. Juliana Berners, the prioress of Sopwell Nunnery, is the authoress of the oldest English work on angling. It was published by Wynkyn de Worde in 1496 under the title "A Treatyse of Fysshynge wyth an Angle."

ANGLO-SAXONS (ănʹglō-săksʹŭns), the name commonly applied to the people formed by an amalgamation of the Angles, Saxons, and other Germanic tribes, and who constitute the English, the Lowland Scotch, and a large portion of the present population of the United States and Canada. By far the greater number of tribes from whom the English-speaking people descended had their seat in the northern part of Germany. The first of these came to Britain about the year 449. From a preponderance of the Angles the country came to be called England, and the language the Angles or English. From Anglo-Saxon institutions have come many modern terms, such as earl, alderman, sheriff, and town. The language spoken by them was largely the language of North Germany, called Plattdeutsch, or Low German. Later it was modified by the Danes, during the Danish supremacy from 1017 to 1042. Still later the Normans, a people of French-Germanic origin, conquered England and introduced a new element into the language, thus giving rise to a number of dialects. These mixtures of tongues were modified largely by the writings of Chaucer in the 14th century, and by successive modifications the spoken tongue eventually developed into the modern English language.

ANGOLA (ăn-gōʹlȧ), or **Portuguese West Africa,** a Portuguese colony in Western Africa, in Lower Guinea, situated south of the Congo Free State, and north of German Southwest Africa. It includes an area of 490,000 square miles and has a population of 4,500,000. Along the Atlantic is a coast plain about fifty miles wide, and beyond that the surface rises rapidly and culminates in elevations about 7,000 feet high. The Coanza is the great water course of Angola. It rises in Lake Mossamba, is about 700 miles long, and flows into the Atlantic Ocean. This stream is scenic and, besides other natural attractions, contains several gorges and a falls with a drop of seventy feet. The inhabitants include every shade of transition from the Negro to the Hamitic type, and every degree of culture from the absolute savage state to the almost semi-civilized condition common to Southwestern Africa. The products and exports consist largely of coffee, gum, wax, ivory, hides, tobacco, palm oil, and cereals. Saint Paul de Loanda is the principal city. It is a thriving seaport and the seat of the government of the colony. Near it is the oldest Portuguese settlement south of the Equator. The city has a large export and import trade, and is provided with railway and other facilities. In 1918 the colony had about 1,200 miles of railways in operation, including a line that penetrates to the interior of Central Africa.

ANGORA (ăn-gōʹrȧ), a species of goat native to Angora, a division of the Turkish Empire, situated in the mountainous interior of Asia Minor. The goat is celebrated for its beautiful silky hair, which attains a length of about eight inches. This goat hair is used in the manufacture of yarn, known in the market as Turkish yarn or camel yarn. The skin of this animal is used in manufacturing oriental morocco leather. The climate seems to favor the growth of hair on dogs, rabbits, and other animals as well as on the goat. When these animals are transported, the vigorous growth of the hair soon disappears, or it loses much of its fineness. Angora goats are reared quite extensively in some parts of Canada and the United States. The town of Angora, situated about 220 miles southeast of Constantinople, is the capital of a vilayet of the same name. It has a large caravan trade and a population of 35,500.


ANGORA GOAT.

ANGOULÊME (än-gōō-lām′), a city in France, capital of the department of Charente, about sixty miles south of Poitiers. It is an ancient city, and in the old part the streets are crooked, but the newer section is platted regularly and has substantial buildings. It is the seat of a naval academy, a college, and a library of 25,000 volumes. The cathedral of Saint Peter dates from 1101. Among the industries are potteries, paper mills, machine shops, and woolen mills. Its location on several railroad lines gives it commercial advantage. Population, 1922, 37,507.

ANGRA (äṉ′grȧ), a seaport on the island of Terceira, one of the Azores, and capital of the Azore Islands, a colony of Portugal. It has a good harbor and is a station for ships between Portugal and the ports of South America. The place is strongly fortified, has a military college and arsenal, and is the seat of a Roman Catholic bishop. The trade is chiefly in honey, wine, flax, and fruit. Population, 11,500.

ANGUILLA (ăṉ-gwĭl′lȧ), or **Snake Island**, an island of the Leeward group, in the British West Indies. The area is 34 square miles. It is low and has considerable forest, but some sections are well grassed and furnish good pasture for stock raising. Salt is obtained from a lake in the center of the island. Maize, tobacco, sugar cane, and cotton are grown profitably. The inhabitants are mostly Negroes. Population, 3,950.

ANGUS (ăṉ′gŭs), **Joseph**, clergyman, born at Bolam, England, Jan. 16, 1816. He was ordained as minister of the Baptist church after studying theology at Stepney College, and in 1849 became president of the Baptist Regents' Park College in London. He was one of the revisers of the English New Testament. His books include "Handbook of English Literature," "Bible Handbook," and "Handbook of the English Tongue."

ANHALT (än′hält), a duchy in the central part of Germany, surrounded by the provinces of Saxony and Brandenburg, with an area of 906 square miles. About 48 per cent. of the people engage in mining and manufacturing. The minerals include coal, granite, iron, and clays. Among the chief manufactures are sugar, soap, cement, leather, clothing, and chemicals. A large majority of the inhabitants belong to the Protestant Church. Agriculture is the principal occupation, in which industry a large diversity of products are obtained. The duchy has a network of railroads and is in a prosperous condition. The capital, Dessau, has a population of 55,134. Anhalt has been governed by the reigning family for several centuries, but its present autonomy dates from 1863. Population, 1920, 331,047.

ANHYDRITE (ăn′hī′drīte), a mineral composed of anhydrous sulphate of lime. It is harder and heavier than gypsum, takes a fine polish, and is used for sculpture. Large deposits are found in Nova Scotia, at Lockport, N. Y., and in Lombardy, Italy. The Italian product is considered of the best grade.

ANILINE (ăn′ĭ-lĭn), one of the numerous products secured by the distillation of coal tar, but first obtained by distilling indigo with caustic potash. The article of commerce is secured largely from benzene. It is a colorless, oily liquid, but when exposed to air absorbs oxygen and turns to a deep brown color. It has a vinous odor and a burning taste, and ignites readily. It is used to produce every shade and all tints of colors, and is employed in the industrial arts for numerous other purposes, besides its extensive use for dyeing materials. Large quantities are employed in the manufacture of inks, for tinting pulps, and for the superficial staining of finished paper. Aniline is also used for a large variety of purposes in manufacturing lithographic inks, perfumery, and fancy soaps. The discovery of aniline dates from 1826, but its larger manufacture for commercial purposes was introduced in 1856 by Perkins of London, who discovered mauve aniline.

ANIMAL (ăn′ĭ-mal), an organic being rising above the vegetable life, especially in possessing will, sensibility, and the power to move from place to place, although there are some animals that have not the power to move from the place occupied. While in general there is no difficulty in distinguishing an animal from a vegetable, yet some forms so closely resemble each other that it is difficult to say whether certain peculiar organisms belong to the vegetable or animal kingdom. All vegetable and animal life consists of various groupings of cells, in the form of jellylike matter called protoplasm. At its beginning all life consists of a minute cell, filled with more or less protoplasm, in which is contained a darker opaque spot called the *nucleus*. Living bodies contain organs, and living matter is therefore called *organic matter* to distinguish it from nonliving or inorganic matter. Every kind of animal has peculiarities that adapt it to live best in some particular place and under particular conditions. Those belonging to any one country are called its *fauna.* The faunae of regions having warm and moist climates are much more extensive than those common to the cold and arid zones, while the sea has a much greater diversity of animal life than the land. Most animals live in the light, but there are some forms that live in dark caves, and whose organs of sight are not fully developed.

For convenience in study, Cuvier divided the animal kingdom into four great subdivisions; but others, among them Huxley, classified animal life into a greater number of groups. The subdivisions made by Cuvier will answer the purpose of this article, and are the following: vertebrates, articulates, mollusks, and radiates; the last three are usually called invertebrates. Each of these divisions is again subdivided into classes; the classes are divided into orders, and the orders into families. Vertebrates are those animals that have an inside skeleton, the backbone of which is called the vertebral or spinal column. To this subdivision belongs man, and it also includes the four-footed animals, birds, reptiles, amphibians, and fishes. Though the skeletons of these animal forms differ in many essentials, they are alike in having a backbone made up of numerous bones fitted together, each one of which is called a vertebra. Articulates include all animals whose bodies are made up of rings joined together. They have no inside skeleton, but their outside shell answers a similar purpose, all the muscles being fastened to it. Mollusks are soft-bodied animals, most of which have shells that serve as a protection for the body. Radiates have a radiated or starlike formed body; they have no head, and many of them have not the power to move from the place where they grow, being fixed like plants to a common trunk. In former times many animals of this class were supposed to be plants on account of their resemblance to vegetables in some particulars, such as corals and sponges.

Animals depend upon organic matter for food, which they derive from plants or from other animals. On the other hand, plants feed upon inorganic matter, and the food, with only a few exceptions, is in the gaseous or liquid state. Carbonic acid, which is generally poisonous to animals, is an essential constituent of the food of plants, while animals require free access to oxygen to sustain life. The food of animals is taken into the body to be digested and the nutritious parts are assimilated, but plants take food through their external surfaces and assimilation is effected by the aid of sunlight.

ANIMAL HEAT, in physiology, a term used to designate the heat produced in the interior of animal bodies, due to the nutritive changes taking place in the blood and the tissues. Living protoplasm being constantly at work disintegrating, the changes produced by it are accompanied by the evolution of heat. The temperature is dependent largely upon the degree of activity and the nature of living organisms. In general it varies from 96° to 100° Fahr., but sometimes falls as low as 90° and rises to 108°, though these extremes are due to a diseased condition of the body. Cold-blooded animals and even plants evolve some heat, and thereby are rendered slightly warmer than the surrounding atmosphere. Cold-blooded and warm-blooded animals agree in the development of heat, but differ in that the former possess greater means of losing heat by the skin and otherwise. In that class of animals the means of losing heat are considerable as compared to the amount of heat produced, while in the warm-blooded animals the production and loss of heat are about equal. Some writers apply the term *animal magnetism* to certain phenomena connected with animal organisms, especially in relation to man, and attribute to persons an influence similar to that exercised by a magnet on iron. This property is generally known as mesmerism, hypnotism, and clairvoyance. See **Mesmerism.**

ANIMAL INTELLIGENCE, the capacity which some animals have to know or understand, which in many respects resembles some of the intellectual characteristics of man. Many animals possess in a more or less highly developed form the senses of hearing, feeling, sight, smell, and touch, but in the lower forms some of these are not highly developed or are entirely wanting. Whether they possess the power to reason has been a subject for extended discussion, and scientists have generally decided the proposition in the negative. Like John Burroughs, they assign the traits in animals that seem to indicate reasoning to animal instinct, or class it as simply physical.

Insects and fishes possess a keen sense of smell, and it is thought that they depend to a large extent upon this sense in selecting their food. On the other hand, in birds and reptiles the sense of smell is not highly developed, though it is thought that the crow and other scavenger birds are attracted by carrion at a long distance. Birds are able to hear with remarkable accuracy, which is evident from the peculiar exactness with which some birds of song are able to reproduce notes uttered by other birds. Fishes are dull in respect to hearing, but the dog is keen both in hearing and smelling, as is seen from the ability with which pointers are able to locate game and bloodhounds trace footsteps. The sense of taste is not well developed in most animals, and they seem to prefer certain classes of food from the odor rather than from the taste, though there are notable exceptions. Birds possess a singular keenness of vision, which is evident from the fact that an eagle is able to distinguish a prey beyond the range of the human eye. The cat, the owl, and some other animals are peculiar for their ability to see more or less in the dark, while the frogs and toads are able to distinguish objects only at short range in daylight. Some peculiarities are found in the sense of touch among animals, especially in the location of the seat of greatest sensitiveness, which in the bat is in the wing and in the cat it is reached through the whiskers. The elephant and the alligator have a skin so thick that the sense of feeling is not easily excited through many portions of the surface.

Some writers refer many acts of animals to their power to *imitate* human acts. This has reference to the tendency of a horse to turn into gates along the highway, which is especially noticeable in an old animal that has been driven until it has become tired. Cats and dogs wait outside during cold weather for the door of the house to open and in summer-time seek the cool shade, but they do so from habit and memory rather than the faculty of reasoning. The so-called educated hog and the trained horse frequently seen at exhibitions do not reason, but learn to act in conformity with the questions of the trainer. It is no more difficult for the horse to select a particular color or object when requested to do so, than it is to follow the directions of gee and haw. *Trixie,* the famous trained horse that has been exhibited in Europe and America, is a marvel in this respect. Modern writers incline to the view that animals possess a high degree of affection and tenderness for their kind, especially the young, as is seen in the care given by some birds and the lion to their offspring. Ernest Thompson Seton, in his "Wild Animals I Have Known," brings this trait out with unusual interest.

ANISE (ăn′ĭs), an annual plant native to Egypt and the Levant, and now cultivated in various parts of America and Europe. About seventy-five species have been described. The common anise is about two feet high, and the *star anise,* a native of China, is a small tree. The fruit is known as aniseed, which yields a volatile oil known as oil of anise. It is used in the manufacture of liquors, as an aromatic in medicine, and for carminative and flavoring purposes.

ANJOU (ăn′jōō), **René, Duke of,** second son of Duke Louis II., born at Angers, France, in 1408; died in Aix in 1480. He married Isabella, heiress of Lorraine, and in 1431 was made Duke of Lorraine. Soon after he became complicated in a war with the Count of Vandemont and was defeated and captured. His liberality won for him the name of René the Good. The former province of Anjou, now included mainly in the department of Maine-et-Loire, was annexed to the royal domain of France by Louis XI., in 1480.

ANNA COMNENA (ăn′nȧ kŏm-nē′ȧ), Byzantine author, born Dec. 1, 1083; died about 1148. She was a daughter of Alexis I., Emperor of Constantinople, and was carefully educated in poetry, science, and Greek philosophy. After the death of her father, in 1118, she conspired to usurp the crown and place her husband, Nicephorus Briennius, on the throne instead of her brother John, but failed in the attempt. Subsequently she engaged in literary pursuits and wrote a work entitled "Alexiad," which is a valuable historic production in fifteen volumes and covers the period of 1069-1118. She is mentioned by Sir Walter Scott in his "Count Robert of Paris."

ANNA IVANOVNA (ī-vä′nŏv-nȧ), Empress of Russia, born at Moscow, Jan 25, 1693; died Oct. 28, 1740. She was a daughter of Ivan, the elder brother of Peter the Great, and in 1710 married the Duke of Courland. In 1730 she succeeded Peter II. on the throne. Her power was limited at the beginning by the decree of a supreme council, but its limitations were broken and she ruled as an autocrat. Within the ten years of her reign fully 20,000 persons were banished to Siberia. She was succeeded by her grandnephew, Ivan VI., under the regency of Ernest John Biron, who had been the most influential statesman during her reign.

ANNAM. See **Anam.**

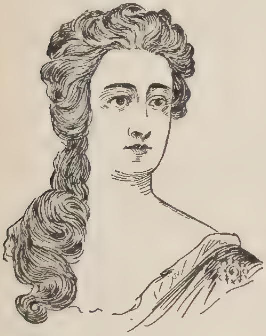
ANNAPOLIS (ăn-năp′ô-lĭs), the capital of Maryland, county seat of Anne Arundel County, twenty-eight miles southeast of Baltimore. It occupies a fine site on the Severn River, has a good harbor, and is on the Annapolis, Washington and Baltimore and the Annapolis and Baltimore Short Line railroads. It has a statue of General DeKalb and good public improvements, including waterworks, a sewerage system, and stone and brick pavements. Among the noteworthy buildings are the State capitol, the Governor's mansion, the county courthouse, and several fine schools and churches. It is the seat of Saint John's College and of the United States Naval Academy (q. v.). The manufactures include machinery, clothing, tobacco products, and utensils. It has a considerable trade, is a port of entry, and has an important market for fruits and oysters. The city was founded in 1649 and received a charter in 1708. Congress held a session at Annapolis in 1783, at which Washington resigned as commander-in-chief. Population, 1900, 8,525; in 1920, 11,214.

ANNAPOLIS, a seaport of Nova Scotia, 100 miles west of Halifax. It is conveniently situated on the Annapolis River, near its entrance into an inlet from the Bay of Fundy. The harbor is well protected, which, together with railway facilities, make it a convenient market for fish, fruit, and cereals. Formerly it was called Port Royal. It is the oldest European settlement in British America, and in

1604 it was made the capital of Arcadia. The English captured it in 1710, and soon after the name was changed to Annapolis in honor of Queen Anne. The seat of government was removed to Halifax in 1750. Population, 1921, 1,019.

ANN ARBOR (ăn är'bor), a city of Michigan, county seat of Washtenaw County, on the Huron River, forty miles west of Detroit. It is on the Ann Arbor and the Michigan Central railroads, has substantially paved streets, electric street railways, waterworks, and a number of parks and libraries. The leading manufactures are lumber products, musical instruments, ironware, tobacco products, clothing, and machinery. It has a fine county courthouse and numerous public schools and churches, and is the seat of the University of Michigan. This institution was founded in 1837, and is one of the most liberally endowed and successful educational institutions of the United States. The first settlement was made at Ann Arbor in 1824 and it was incorporated in 1851. Population, 1904, 14,509; in 1920, 19,516.

ANNE (ăn), Queen of England, the last sovereign of the house of Stuart, born near London, Feb. 6, 1665; died, Aug. 1, 1714. She was the second daughter of James II., then Duke of York. Her mother died when she was only seven years old, and with her father's permission she was educated according to the principles of the English church, to which she remained attached all her life. She was married to Prince George, brother of the King of Denmark, when she was twenty years of age. On March 8, 1702, she became Queen of England, succeeding William, Mary having previously died without heirs. In her reign of about twelve years events of vast importance occurred, and her name became associated with a notable epoch in the history of English literature because of the many writers who lived in that period. These include Dryden, Swift, Defoe, Addison, Pope, and the scientist Isaac Newton. Though deficient in mental vigor, she possessed considerable amiability. Queen Anne was the mother of seventeen children, all of whom died in infancy except one son, the Duke of Gloucester, who died at the age of twelve years. While literature and science are not indebted to her for extensive encouragement, her reign covers a period in which her country made material progress in both.



QUEEN ANNE.

ANNEALING (ăn-nēl'ing), the process by which glass, steel, iron, and other substances are heated and then cooled slowly to render them less brittle, or to increase their degree of ductility and malleability. When metals are given form in the process of manufacture, as in rolling them into plates or drawing them into wire, they become somewhat brittle and are made more serviceable by annealing. By this process also is diminished the elasticity of metals, as to impart to springs the precise measure of elasticity deemed the most suitable.

ANNE BOLEYN (bo͝ol'ĭn), queen of England, one of the wives of Henry VIII., born about 1507; beheaded May 19, 1536. She was a daughter of Sir Thomas Boleyn, afterward Earl of Ormond and Wiltshire, and was selected to accompany Princess Mary to France in 1514 at the time of her marriage with Louis XII. In 1522 she was recalled to England and admitted to the household of Catharine of Aragon. Her beauty, wit, and accomplishments attracted Henry VIII., who declared his intention to marry her in 1527, but, failing to obtain a divorce from Catharine, the marriage was postponed until in 1533. However, the ceremony was performed before a divorce had been obtained and many legal complications resulted. She soon lost the favor of the king, who became attracted to Jane Seymour, her maid of honor, and was eventually imprisoned on a charge of infidelity and executed. Anne Boleyn was the mother of Queen Elizabeth. It is extremely questionable whether her death can be justified.

ANNIHILATIONIST (ăn-nī-hĭ-lā'shŭn-ĭst), the term applied to one who believes in the doctrine of man's annihilation at death. This doctrine had its origin in England in the 18th century, when several prominent writers, including Archbishop Whately, wrote on subjects relating to *eternal death,* and from these writings originated a widespread belief in literal destruction. As now understood, annihilationism is a belief in the bodily and spiritual extinction of man's being.

ANNISTON (ăn'ĭs-ton), a manufacturing city of Alabama, county seat of Calhoun County, eighty-seven miles northeast of Birmingham. It is on the Louisville and Nashville, the Southern, and other railroads, and in the vicinity are extensive iron mines. The manufactures include ironware, machinery, cotton goods, clothing, and tobacco products. The city has electric lights, pavements, waterworks, and other municipal improvements. It has a number of fine public school buildings, about forty-five churches, and several well-selected libraries. It is the seat of an excellent Carnegie library, the Alabama Military Institute, and the Barber Memorial Seminary (for colored students). The city was founded in 1873 by the Woolstock Iron Company, under the management of Samuel Noble. Population, 1900, 9,695; in 1920, 17,734.

ANNUAL (ăn'ū-ăl), in botany, a plant whose whole course of development is completed in one season, during which it germinates, flowers, perfects its seeds, and perishes, never again to grow from the same roots. Some grains are the products of annuals, such as oats and corn. The cockscomb, phlox, and marigold are examples of garden flowers belonging to the annuals. Some hardy annuals, like the morning-glory, may be sown in autumn to germinate in the spring.

ANNUITY (ăn-nū′ĭ-tȳ), a fixed sum of money paid annually, or at intervals, either for a definite term of years or the continuation of a given life, or a combination of lives. The term is used largely by insurance companies, who stipulate the payment of definite amounts. The theory is an application of algebra to the fundamental idea of compound interest. According to this idea, any sum of money invested at interest is increased at the end of interest-payment periods by the addition of accrued interest. The first addition is at the end of the first payment period. At the end of the second payment period a second addition of interest is added to the sum, and thus additions are made in the same way by interest accruing from time to time until a definite amount has been reached. Life annuities are based on a knowledge of the rate of mortality among mankind, or among the particular class of persons upon whose life the annuity depends. Annuities are the reverse of life insurance. An annuitant is paid to live, while an insured, through his representative, is paid to die.

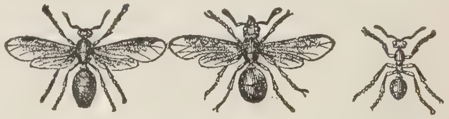
ANNUNZIO (dȧn-nōōn′dzê-ô), **Gabriele d’,** novelist and poet, born at Pescara, Italy, in 1864. He studied at Prato and in 1879 published his first volume of lyric poems. These poems became popular and were widely read. His style of writing resembles somewhat the Russian, especially that of Tolstoy, and many of his works have been translated into the leading European languages. He is one of the most influential Italian writers of the 20th century. In 1919 he took possession of Fiume with 5,000 soldiers, expecting to annex it to Italy, but he was ejected in 1921. Among his books are “In Memoriam,” “The Child of Pleasure,” “The Intruder,” “The Triumph of Death,” “Virgins of the Rocks,” and “The Flame of Life.”

ANODE (ăn′ōd), in electricity, the positive pole of an electric current, or that surface by which the current enters the body (electrolyte), undergoing decomposition. The negative pole, by which the current leaves the electrolyte, is called the cathode.

ANSELM (ăn′sĕlm), Archbishop of Canterbury, born near Aosta, Italy, in 1033; died in Canterbury, England, April 21, 1109. His family was counted among the nobles of Italy and possessed considerable wealth. At the age of fifteen he devoted himself to the service of God by entering a convent. In 1090 he traveled to Burgundy and France, and finally settled at the monastery of Bec. Subsequently he was invited to England, where he was consecrated Archbishop of Canterbury in 1093. He is the author of several treatises on church discipline and doctrine. The Roman Catholic Church observes the day of his death.

ANSONIA (ăn-sō′nĭ-ȧ), a city of Connecticut, in New Haven County, on the Naugatuck River. It is on the New York, New Haven and Hartford Railroad, has a considerable trade in merchandise, and is important as a manufacturing center. The products include novelties, clocks, iron and brass wares, machinery, electrical appliances, and textiles. It has a fine system of public schools, numerous churches, and a public library. Among the chief buildings are the State armory and the Y. M. C. A. building. The municipal improvements include electric street railways, waterworks, electric lights, and a sewer system. The first settlement was made on the site of Ansonia in 1840 and it was chartered in 1893. Population, 1920, 17,643.

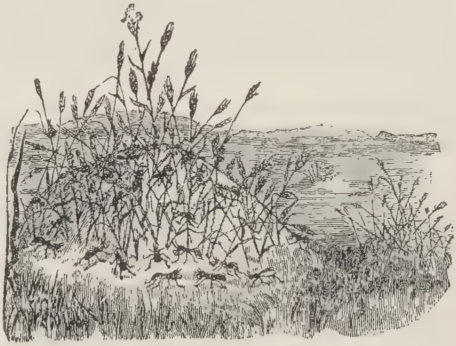
ANT (ȧnt), an insect belonging to the order of membranous-winged insects, of which there are several hundred species in different regions of the earth. They live in colonies or families, sometimes many thousands in number, and are divided into three classes, females, males, and workers. The females and males have wings, but the workers, or neuters, are wingless. As to size, the females are the largest, the males are slightly smaller than the females, and the workers are the smallest. The ordinary work is done by the workers and the principal part in warfare, both defensive and offensive, is taken by the soldiers, which are made up of the workers. The males and females constitute but a small portion of each community. After the pairing season, the males wander away and soon die. The females lay little eggs, so small that they can hardly be seen by the naked eye, and the eggs are scattered about in the nest wherever the females happen to be at the time the eggs are deposited. They are taken by the workers and put in the sun in the morning, and at night are stored in the nest until they are hatched. The larvae or grubs, hatched from the eggs, are small, white worms, and are carried back and forth in the same way as the eggs by the workers, who nourish them with a liquid from the stomach until they reach the proper age to spin their own webs around themselves, which cover them like the cocoon of a silkworm. The cocoons are carried into the sunlight the same as the eggs and grubs were, and, when ripe, for their second birth, the workers cut them out of their inclosed cells and they soon become perfect ants.



The workers are the most intelligent and interesting of the three classes of ants. They not only take care of the eggs, grubs, and cocoons, but do the work of the society, which includes the building of houses and streets and keeping them in repair. In their work they show wonderful ingenuity in carpentry, masonry and mining. Most ants build their houses or nests in the ground, and many construct cones or hills over them, which are known as ant-hills. In them are many rooms, with galleries connecting the different apartments. Others construct large pillars, from which arches are extended, and are covered with loose straw and sticks. In tropical regions the ant-hills are frequently from twelve to eighteen feet high. A class of ants, known as mining ants, construct long galleries in clay, in which pillars support the roof and many rooms and stories are provided. Carpenter ants build their houses in growing trees by boring deep cells into the wood and constructing rooms and galleries by unique partitions. In Australasia several species of ants are found that build their houses of leaves fastened together with a kind of glue. Oftentimes several ants unite to carry particles for the construction of their houses, and in this way they are able to move material much larger and heavier than the aggregate of the ants employed in construction work.

The chief substance used by ants for food is sugar taken from vegetables. Their sense of smell seems to be so acute that they can easily locate sugar substances in plants. Honeydew is a sugar fluid found in the aphis, a small insect, and is a favorite food of many kinds of ants. To obtain it they are often seen to touch the aphis with their antennae, and, after a drop has been obtained, they pass on to another aphis. The process has been likened to the milking of a cow or camel. Ants that feed upon animal food render important service in that they clear away carrion. The flesh of a small animal buried for a short time in an ant-hill will be entirely consumed, only the skeleton remaining. In tropical countries ants prey upon living animals and sometimes kill birds, reptiles, and small quadrupeds by attacking them in vast swarms. In some regions ants are so numerous that communities of them have been known to attack domestic animals when sick, and there are a number of instances in which man himself dreaded their ravages. On the island of Grenada, about one hundred years ago, vast numbers of a particular kind of ants appeared. They descended from the hills like torrents and filled every path and road for miles, preying upon rats, mice, and reptiles, and were stopped in their onward progress only by streams of water. Every means to destroy them was unsuccessful until in 1780, when a hurricane exposed them to a deluge of rain and freed the island of them.

Some ants carry on war against other species and take their young into slavery. The fighting ants are red, and are generally regarded too stupid to take care of themselves, and would die from starvation if they did not have in captivity others to provide for them. However, ants have many enemies, being consumed in large numbers as food by birds, while some quadrupeds, as the aard-vark and the ant-eater, dig into their habitations and consume great numbers of them. *Termites,* or white ants, belong to a different order from the common ants, but are like them in their habits. They live in the tropics, in vast communities, and are regarded a very dangerous pest. In Africa they are found extensively, where several species burrow in wood or excavate dwellings underground, and some build mounds above the surface of the plain. These are very productive, a single female often laying over 80,000 eggs. They live mainly on dry and decaying woods. The natives use them as an article of food, for which purpose they are pressed or pounded into a jam, which they regard a delicacy.



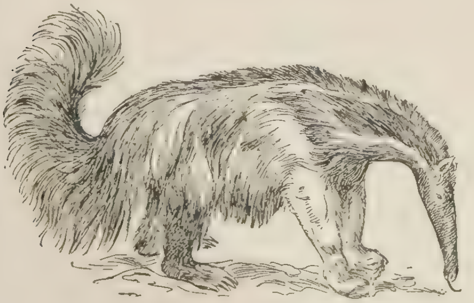
ANT-HILL.

The intelligence of ants is recognized as a remarkable circumstance of nature. They are sensitive to changes in temperature and moisture, and exceed the human range of ability to observe sound waves. They remove the dead promptly, care for the injured, and observe cleanliness in caring for the young. Naturalists assert that ants communicate with each other and are able to recognize each individual of a community.

ANTAEUS (ăn-tē'ŭs), in mythology, a giant of Libya, son of Neptune and Terra. He was mighty in combat and remained invincible as long as his feet touched the earth. Many mortals of great physical strength and skill went to Libya to engage him in combat, but he vanquished large numbers, and a temple was built to his father, Neptune, with the skulls of the vanquished. He was finally conquered by Hercules, who lifted and strangled him while suspended in the air.

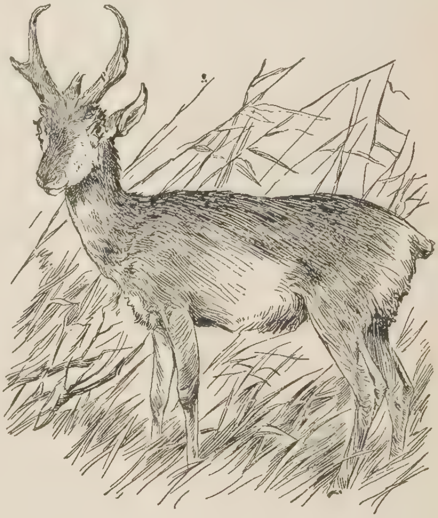
ANTANANARIVO (ăn-tȧ-nä-nȧ-rē'vō̤), or **Tananarivo,** the capital and chief city of Madagascar, situated near the center of the island, 165 miles southwest of Tamatave. It is in a mountainous region with an elevation of 4,500 feet above the sea. The streets are irregular and crooked, most of the buildings are of wood, and the inhabitants are chiefly natives, including only about 200 French. Its commerce is not important, but it has manufactures of jewelry, silk stuff, clothing, and utensils. An improved highway extends to Tamatave, but the transportation facilities are inadequate. Population, 1920, 65,840.

ANTARCTIC (ănt-ärk'tĭk), meaning opposite to the Arctic, and relating to the region surrounding the South Pole. The Antarctic Circle, a circle imagined drawn parallel to the equator, forms a small circle around the earth at a distance of 23° 28′ from the South Pole. The Antarctic Ocean is that portion of the sea which surrounds the South Pole, and lies immediately south of the Atlantic, Pacific, and Indian oceans. It has been explored by navigators, and is known more or less satisfactorily as far as 75° south latitude. Roald Amundsen (born in 1872) in 1911 discovered the South Pole, which lies in a region 10,200 feet above sea level. Owing to great dangers and difficulties in southern navigation, only a small portion of the Antarctic region is definitely known. The land masses of this region of the earth include Graham's Land, Enderby Land, and Victoria Land. A part of these land areas are accessible, and the sea in their proximity has yielded valuable returns through the seal and whale fisheries. However, they contain cliffs of perpetual ice and their valleys are covered with everlasting snow. A large part of the Antarctic Ocean is clouded with constant fogs. Baffling currents and numerous icebergs, together with extreme cold, make navigation difficult. The Antarctic Ocean is richer in life, especially deep-sea fauna, than the other oceans. On the coast of Victoria Land is Mount Erebus, a volcano 12,400 feet above the level of the sea.


GREAT ANT-EATER.

ANT-EATER (ȧnt ēt'ẽr), the popular name of a quadruped mammal native to South America, and belonging to the order *Edentata.* The mouth is perfectly toothless, and the food consists of insects, chiefly ants. It has small eyes, short and rounded ears, and powerful claws. The tongue is long and wormlike and coated with a sticky saliva, and is thrust out to catch the food. Though large and powerful, the ant-eaters are very stupid and inoffensive, and are an easy prey to animals weaker than themselves. The average length of the body is about four feet, not including the bushy tail, which is nearly as long as the body. The aard-vark, a species of ant-eater, is native to South Africa. It lives chiefly on the termites, whose nests it tears down in search of food. Other animals classed with this group include the manid, or scaly ant-eater, and the echidna, or porcupine ant-eater, of Australia.

ANTECEDENT (ăn-tē-sēd'ĕnt), a term used to express precedent in point of time. The term *antecedent* is applied in grammar to a word going before a relative pronoun, or a substantive to which the pronoun relates. In logic the antecedent is that part of a constitutional proposition upon which the other depends, and in mathematics it implies that quantity which is considered first in making comparison with another number.


ANTELOPE.

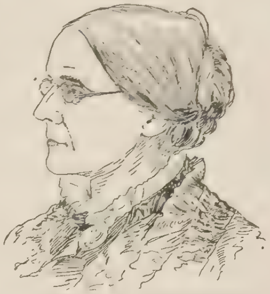
ANTELOPE (ăn'tē-lōp), a genus of ruminating mammals quite similar to the deer. The horns are hollow and encircled by rings at the base, but are not renewed annually. They are swift of foot, have large lustrous eyes, and when fleeing before a foe take enormous leaps. The smallest species are found in South Africa, such as the guevi, or bluebuck, which is about thirteen inches in height, while the largest species are from five to seven feet. Two representatives of the antelope family are native to North America, and allied species are found in Eurasia, particularly in India. The American antelopes include the prongbuck and the mountain goat. The latter possesses a coat of long woolly hair, and in form is closely allied to the chamois of Europe. The eland and gazelle are species native to Africa, the latter being confined largely to the northern part of that grand division. A species of Northeastern Africa, the addax, has spirally twisted horns about four feet long. Most species are so fleet of foot that greyhounds cannot catch them, and are capable of leaping a height of from eight to twelve feet, while the length of their bounds is fully as great. The flesh is highly prized as food, for which they are hunted, and the skin is valuable in making gloves and other wearing apparel.

ANTENNAE (ăn-tĕn'nē), the organs of insects located nearly in the same position as horns in some of the animals, and composed chiefly of minute articulate rings. They are two in number and are found in nearly all insects, only a very few excepted. In moths the antennae look like feathers, and those of butterflies have little knobs at the tip. Similar appendages are common to the lobster and other crustaceous animals. They serve the purpose of organs of touch and probably of hearing. With them the animal is enabled to feel its way and test surrounding objects. In some animals the antennae possess organs of taste, sound, and smell, and it is known that at least several species of the lobster are capable of hearing by organs located at the extreme end. Deprived of this organ, this class of animals becomes largely inactive, while the ant becomes helpless.

ANTHER (ăn'thẽr), a part of the stamen of a flower, and generally attached to the apex of the filament. It is the male organ of the flower, and usually contains two cells, which are filled with the pollen. At shedding time the pollen escapes through a longitudinal fissure, which generally extends from the base to the apex. In some flowers the anther is a direct continuation of the filament, when it is said to be innate; in others it grows to the side or face of the filament, when it is designated adnate; and it is versatile when it is attached to the middle of the anther.

ANTHONY (ăn-tō'nĭ), **Henry Bowen,** journalist and legislator, born in Coventry, R. I., April 1, 1815; died Sept. 2, 1884. He attended Brown University and engaged in journalism. In 1849 he was elected Governor of Rhode Island on the Whig ticket and was reëlected in 1850, and served as a Republican member of the United States Senate from 1859 until his death. He was three times elected president pro tem of the Senate, and was popular as a member of numerous committees.

ANTHONY (ăn'tō-nĭ), **Susan Brownell,** born in South Adams, Mass., Feb. 15, 1820; died March 13, 1906. She was educated at a Friends' boarding school in Philadelphia, and taught in New York for fifteen years. As a school teacher she was efficient and progressive, and in addition to her pedagogical work she developed influence as a contributor on literary and social topics to several magazines. Devoted as a teacher and earnest as an advocate of educational progress, she made for herself a wide circle of friends. In 1847 she began lecturing on temperance, and became a prominent agitator for the abolition of slavery. She was instrumental in obtaining laws allowing women the right to speak, vote, and serve officially in educational matters. In 1867 she canvassed the State of Kansas for the cause of female suffrage, which proposition received about 9,000 votes in an election. In 1872 she cast ballots at the State and Congressional election for the purpose of testing the 14th and 15th amendments to the United States Constitution. For this she was fined $100 on a charge of illegal voting, but she refused to pay the penalty and it was never collected. With others she wrote "History of Woman Suffrage," and in 1892 Governor Flower appointed her to an official position in the State Industrial School, Rochester, N. Y. An able orator and proficient writer, she wielded marked influence with voice and pen.


SUSAN B. ANTHONY.

ANTHRACITE (ăn'thrȧ-sīt), a variety of coal differing from the common, or bituminous, in that it contains a larger proportion of carbon. It is distinguished by its compactness, bright luster, and high specific gravity. Though difficult to ignite, it is smokeless and gives an intense heat. The bituminous coal contains about eighty per cent. of carbon, while the anthracite possesses from ninety to ninety-five per cent. It is most abundant in the Alleghany Mountains and in the province of Shansi, China, but is found in considerable quantities in Wyoming, New Mexico, British Columbia, France, and Russia. Anthracite coal, next to diamond, is the purest form of carbon.

ANTHROPOLOGY (ăn-thrō̇-pŏl'ō̇-gy̆), the science devoted to the study of man and mankind. It is the newest of the sciences and may be said to embrace the three departments of somapology, psychology, and ethnology. Somapology, or the biology of man, places mankind in the zoölogical system and treats man as an animal, while phychology is the science of the human soul and embraces comparative psychology, which investigates the mind of the lower animals. Biology is a study of man in relation to the arts of life. See **Biology, Ethnology,** etc.

ANTHROPOMETRY (ăn-thrō̇-pŏm'ē̇-try̆), the measurement of the height and other dimensions of the human body, especially at different ages and under the influence of various habits and occupations, to aid in classification as to physical and mental characteristics. This subject has received growing attention in recent years, especially from the standpoint of education, medical treatment, physical culture, and in criminology. Since no two individuals are alike in all dimensions and are influenced variously by their environments, it has been found profitable to employ measurements when considering the treatment of individuals at different ages and for a variety of causes. Craniometry is a system of measurements of the skull, and some schools regard it the most important part of anthropology, while others do not look upon it as being of over-shadowing importance and think it expresses only trifling variations in individuals. The measurements regarded of primary importance in anthropometry are those taken while the body is at rest. They include facial angle (q. v.), position and size of ears, shape of head, position and attitude of eyes, size and form of nose, length of fingers, size of feet, length of thigh and forearm, circumference of waist and shoulders, length of limbs, sitting height, expansion and circumference of chest, stature, weight, age, etc. Considerable importance is attached to the color of the eyes and hair, beard and body hair, form and color of the mucous membrane and nails, and the peculiarities of features and movement of the visible organs. The habits of individuals are studied, especially in regard to the food eaten, clothing worn, and the character and amount of work done and rest taken. Some attach considerable prominence to the dynamic aspect of anthropology, and in consequence substitute largely the measurement of functions, such as the rate of pulsation and respiration.

ANTICHRIST (ăn'tĭ-chrīst), a name employed by Christian writers to designate a supposed powerful institution destined to stand in opposition to Christianity. It is referred to in I. John ii, 18-22; iv, 1-3, but the idea seems to have originated before the Christian era, at least some writers quote in favor of this view the prophecy of Ezekiel concerning Gog and Magog. A number of Protestant writers, both before and since the Protestant Reformation, have referred to the pope or the papacy as the antichrist, while both Protestant and Catholic writers have referred to Nero, Diocletian, and other emperors who persecuted Christians as the antichrist.

ANTICOSTI (ăn-tĭ-cŏs'tĭ), an island in the Gulf of Saint Lawrence, belonging to the Province of Quebec, near the mouth of the Saint Lawrence River. It is 40 miles wide and 135 miles long, and has an area of 2,500 square miles. Fox Bay, in the northwest, and Ellis Bay, to the west, are the larger indentations and have good harbors. Much of the interior is wooded, though a considerable part furnishes pasture. In the northern section are mountains, and numerous swamps and rocky districts prevail. Cod, trout, salmon, and herring fisheries abound near the coast. Few settlements have been made, owing to the severe climate, and the population at present does not exceed 250.

ANTIDOTE (ăn'tĭ-dōte), a medicine employed to neutralize the effect of a poison. The antidotes are classed as chemical and physiological. The chemical antidotes neutralize the poison by converting it into an insoluble or harmless substance, while the physiological antidotes produce action within the body, by which it is enabled to resist the injurious effects of the poison. Acids and alkalis act upon each other as chemical antidotes, while morphine and atropine have opposite actions upon the body. Both opium and belladonna are poisonous, but act as antidotes to each other. Ammonia and alcohol are given in certain snake poisons, acting as physiological antidotes. See **Poison.**

ANTIETAM (ăn-tē'tam), a small stream of the United States, rises in Pennsylvania, thence flows into Maryland, and joins the Potomac about fifty miles from Washington. It is noted as the scene of an indecisive battle fought Sept. 17, 1862, between the Union army numbering 57,640 men under General McClellan, and the Confederates with 38,000 men under General Lee. The battle continued with great slaughter the entire day. The Union loss aggregated over 11,000 and the Confederates lost 10,000 men. Lee's army retreated on the 18th, recrossing the Potomac soon after. While the result was indecisive, it tended to give great encouragement to the Union cause, and, on the strength of this battle, President Lincoln issued the Emanicipation Proclamation abolishing slavery

ANTI-FEDERALISTS (ăn'tĭ-fĕd'ẽr-al-ĭst), a political party in the United States, organized in opposition to the Federal party. Thomas Jefferson was the principal leader, and it stood in favor of strict construction of the Constitution as against the centralizing tendencies in the administration of government. However, the ground originally occupied was at least in part abandoned after the election of Jefferson in 1800, since he favored the purchase of Louisiana and other measures possible only under a liberal construction. The name was changed to Republican in 1793, and soon after the organization became known as the Democrat party.

ANTIGO (ăn'tĭ-gȯ), a city of Wisconsin, county seat of Langlade County, about seventy-five miles west of Menominee, on the Chicago and Northwestern Railroad. It has a fine public school system, and is provided with modern municipal facilities, such as waterworks and electric lights. The manufactures include furniture, flour, lumber products, broom handles, clothing, and machinery. It has a large trade in cereals, merchandise, and live stock. The first settlement was made in 1878 and it was incorporated in 1884. Population, 1905, 6,663; in 1920, 8,151.

ANTIGONE (an-tĭg'ō̇-nē̇), a tragic character in Greek legend, the daughter of Oedipus, and known for the faithfulness with which she attended her father after resigning his throne in Thebes. The story is told that he put his eyes out when told that the mother of his children was also his own mother, but Antigone attended him till his death. She is known for the burial of her brother, Polynices, in defiance of a decree of Creon that he should not be buried, for which she was sentenced to be buried alive in a vault. Sophocles made her the heroine of his "Oedipus at Colonus."

ANTIGUA (ȧn-tē'gwȧ), one of the Leeward Islands, twenty-two miles south of Barbuda. It belongs to the British West Indian Islands and has an area of 108 square miles. The coast is indented with small inlets, the surface is rugged, the soil fertile, and the climate favorable to the cultivation of sugar cane and fruit. Barbuda and Redonda are dependencies of Antigua and for government purposes are united to form one of the five presidencies of the Leeward Islands. Columbus discovered Antigua in 1493 and it was settled by the English in 1632. Saint John, the capital, has a population of 10,000. English Harbor is the best port. Population, 1926, 34,970.

ANTILLES (ȧn-tĭl'lēz), the name applied to the whole of the West Indies, except the Bahamas. They stretch eastward from the Gulf of Mexico and form a half circle. They are divided naturally into two sections: the Greater Antilles, lying to the north and west, and the Lesser, to the east and south. The Antilles include about 360 islands, all of which are more or less fertile, have a tropical climate, and are frequently visited by hurricanes. The chief products are rice, tobacco, corn, cotton, sugar, rum, coffee, vegetables, and tropical fruits. The Greater Antilles include Cuba, Jamaica, Porto Rico, and Hayti, and the Lesser Antilles embrace nearly all the remainder of the islands. The area of the entire islands aggregates about 94,398 square miles. See **Cuba, Porto Rico, Jamaica,** etc.

ANTIMONY (ăn'tĭ-mō̇-nȳ̆), a metal of a bluish-white or silver color, and commonly found in nature alloyed with other metals. Large veins producing antimony occur in California, Sweden, Chile, Mexico, Australia, Borneo, and many other countries. It is brittle and is easily reduced to a powder. It is hardened by alloying with other metals. On account of not tarnishing or rusting, it is valuable as an alloy in making type metal. It is used extensively as a medicine and in the arts, especially for coloring and in the manufacture of lead pencils. A variety known as *yellow antimony* is well suited for painting porcelain and for enameling.

ANTINOUS (an-tĭn'o-us), a beautiful youth of Bithynia, employed as a page to Emperor Hadrian, whom he accompanied in all his travels. He was mysteriously drowned in the Nile in 132 A. D., and was greatly mourned by the Emperor. His memory was perpetuated in statues, busts, and reliefs, several of which are still in Rome. He was enrolled among the deities, and temples were built to his memory in Egypt and many parts of the Roman world.

ANTIOCH (ăn'tĭ-ŏk), an ancient city of Syria, on the Orontes River, founded by Seleucus Nicator in 300 B. C., and long celebrated as one of the finest cities of the East. It was one of sixteen cities of this name built in memory of Antiochus, father of the founder, who was one of the generals of Philip of Macedon. The people were noted for intelligence, wealth, and luxury, and it had a large commercial trade by caravans. In this city the name *Christian* was first applied to the disciples of Christ. Much human life and many of the chief buildings were destroyed by earthquakes in 526 and 587 A. D. In the ruins were found the remains of 250,000 people who had been killed by the great upheavals. It was conquered alternately by the Saracens and the Crusaders, and was razed to the ground by the Mamalukes in 1269. Since 1516 it has been a possession of the Turks. The ancients spoke of it as "Antioch the Beautiful." Its site is now occupied by Antakieh, or Antakiyeh, a market and residence town. Population, 27,500.

ANTIOCHUS (an-tī'o-kus), the name of several kings of Syria who reigned from 280 to 64 B. C. They are noted for the conquest of India and other regions of Asia. Antiochus III. was the greatest of these kings. He reigned from 223 until 187 B. C., and in 212 defeated Xerxes of Armenia in a great battle at Arsamosata.

ANTIOQUIA (än-tē̇-ō'kē̇-ȧ), a city of Colombia, in the state of Antioquia, on the Cauca River. It is situated on an elevation 1,890 feet above the sea. The surrounding country contains productive mining and lumbering interests. It has considerable trade in maize, sugar, and tobacco. Population, 9,150.

ANTIPODES (ăn-tĭp'ō̇-dēz), a word of Greek derivation, used to denote peoples or places on opposite sides of the earth, so situated that a line drawn from one to the other would pass through the center of the earth and form a true diameter. Thus the south pole is exactly antipodal to the north pole, noon at one place is midnight at the other, the longest day corresponds to the shortest, and the midsummer to midwinter. A voyager sailing east anticipates the sun and his dating at the opposite side will be twelve hours in advance, while one sailing westward will fall as much in arrear. At the point of meeting there will be a whole day, twenty-four hours, difference between them. This has been at least twice exemplified; the Russians sailing from the west to the northwest coast of North America were a day in advance of the British who sailed from the east; while the Spaniards coming from the east of the Philippines were a day behind the Portuguese in Macao, who came from the west.

ANTIPODES ISLAND, a small island southeast of New Zealand. It has an area of eleven square miles and is uninhabited. It was so named because it is nearly the antipode of Greenwich.

ANTIPOPE (ăn'tĭ-pōp), a term applied to those persons who claimed an election to the Papacy by the suffrage of the cardinals, or otherwise, but whose claims were for some reasons not deemed valid by the church. Novatian, the first antipope and founder of the sect of Novatians, procured his election in 252 in opposition to Cornelius. According to some writers there were fourteen antipopes, but the number usually given is thirty-one, the apparent difference being due to the fact that a number of writers do not recognize the claims of all who are usually credited with some degree of right to recognition. The antipopes were elected by religious factions or set up by political parties. Felix V., the last antipope, was a Duke of Savoy and made claim to the See in 1431. See **Pope.**

ANTIQUARIES (ăn'tĭ-kwȧ-rēs), **Society of,** the name of an association established by learned men of America and Europe, whose object is the study of antiquity. Beginning with the Revival of Learning, much interest was aroused in a study of classical productions of Greece and Rome. Accordingly every obtainable relic was secured and preserved. Organizations for the study of this branch of learning were not generally established in Western Europe until about 1572. The present Antiquarian Society of London consists of a council of twenty-one and one hundred fellows. This society and several others of Europe and America have published some valuable works and have added largely to the literature treating of antiquities.

ANTISEPTICS (ăn-tĭ-sĕp'tĭks), the substances that prevent or retard putrefaction of animal and vegetable matter. It has been demonstrated that putrefaction in fermentation generally depends upon the presence of miscroscopic vegetable organisms. Hence, to prevent it, an agent is necessary that will destroy these microörganisms, or exclude them entirely. Among the substances used are salt, alcohol, creosote, tannic acid, arsenic, aloes, camphor, benzene, chloroform, and many others. Salting is a common way of preserving herring, fish, and meats, or perishable commodities of this kind may be packed in ice as a means of keeping the temperature too low to permit decay. Besides their use in the preservation of foods, many forms of antiseptics are used in the treatment of wounds and in the prevention of infectious diseases, as carbolic acid and formaldehyde. The properties of infectious matter commonly found in contagious diseases appear closely analogous to organisms that lead to putrefaction in fermentation. These can be rendered inert by exposure to a high temperature, or by the use of antiseptics, such as an application of chloride of zinc, carbolic acid, or other equally efficient agents. By a liberal application of these substances to the bedroom or house containing germs of contagious diseases, the infection may be destroyed and prevented from spreading. Besides, antiseptics are used in surgery for the treatment of wounds, with the view of preventing harmful organisms from developing. This is done largely by allowing air to reach the wounds only through substances capable of destroying the germs in the atmosphere, upon whose presence the generation of suppuration depends. The general term *disinfectant* is applied to any agent that destroys microörganisms, and at the same time removes the harmful products of fermentation and putrefaction.

ANTITOXIN (ăn-tĭ-tŏks'ĭn), the name of a preparation of value in treating diphtheria, cholera, bubonic plague, and other diseases due to the development of bacteria in the blood. Diphtheria antitoxin is prepared by injecting diphtheria poison under the skin of some animal, usually a horse, the quantity being sufficient to give rise to a slight illness in a few days. The injection is repeated as soon as the animal regains its health, but the quantity of the poison is increased after repeated recovery. In the course of several months a condition is developed in the animal under which it can bear the injection of several hundred times as much poison as the minimum quantity that at first would have resulted in death. When in a proper state of development, several gallons of blood are withdrawn from the horse, the serum or watery part constituting the antitoxin. Persons afflicted with diphtheria are relieved by injecting it under the skin, and such treatment also gives immunity to persons exposed to but not affected by the disease. Other antitoxins have been prepared and used successfully.

ANT-LION (ȧnt lī'ŭn), the larva of several species of insects, which, when fully developed, are similar in appearance to the dragon fly. These insects are common to the sandy regions of many countries, and about fifty species of North America have been described. They are most numerous in semiarid districts, such as Mexico and the part of the United States lying north of the Rio Grande. The ant-lion is remarkable for the curious and ingenious method by which it catches the ants and other insects on which it feeds. A cavity in the form of a funnel is excavated in the sandy soil, the sides being smooth and sloping uniformly, and at the bottom the ant-lion waits until an insect comes so near to the edge that it falls into the pit, where the juices are sucked out of its body. When ready for another prey, the skeleton of the dead insect is removed and the ant-lion awaits another insect.

ANTOFAGASTA (än-tȯ̆-fȧ-găs'tȧ), a city of Chile, capital of a province of the same name, situated on the Pacific coast. In its vicinity are extensive deposits of saltpeter and some distance inland are the rich silver mines of Caracoles. A railroad extends inland, making it an important market for domestic and foreign trade. Formerly both the city and province belonged to Bolivia, but in 1882 they were ceded as the result of a war between the two countries. Population, 1926, 52,683.

ANTONELLI (än-tȯ̆-nĕl'lē̇), **Giacomo,** cardinal and statesman, born at Sonnino, Italy, April 2, 1806; died Nov. 6, 1876. He studied in Rome and on account of intellectual ability gained the favor of Pope Gregory XVI., who attached him to his suite. In 1841 he became undersecretary of state to the ministry of the interior, and in 1844 was chosen minister of the apostolic chambers. Subsequently he was raised to the dignity of cardinal deacon, and in 1848 was president and minister of foreign affairs. He accompanied the Pope in his flight to Gaeta, but returned to Rome with the Pope when France exerted its friendly offices in support of the papacy.

ANTONINUS PIUS (ăn-tȯ̆-nī'nŭs pī'ŭs), **Titus Aurelius Fulvius,** Emperor of Rome, born near Rome, Sept. 19, 86 A. D.; died in 161, after a reign of twenty-three years. He was one of four persons of consular rank among whom the supreme administration of Italy was divided by Hadrian. His wise administration as proconsul of Asia greatly increased his reputation, on account of which he was adopted as the son of Emperor Hadrian, whom he succeeded as Emperor in 138. He made himself popular from the first by his wisdom and kind disposition and extensive experience in conducting the affairs of the government. Instead of plundering the provinces, he aided them in building highways and fostering trade, abolished the persecution of Christians, extended Roman dominion in Britain, and stopped the invasion of the Scots and Picts. He was surnamed Pius by the Senate, which was done because of the building of a temple under his direction in memory of Hadrian. He was succeeded by his adopted son, Marcus Aurelius.

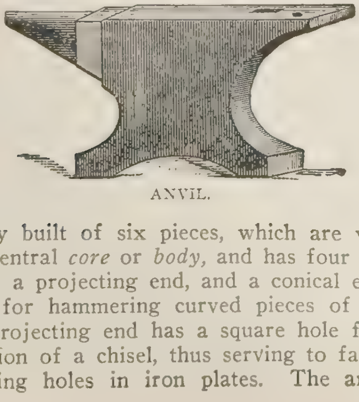
ANTONIUS (ăn-tō'nĭ-ŭs), **Marcus,** Roman orator, grandfather of Mark Antony, born in 143 B. C.; died in 87. He was appointed to the office of quaestor in 113, of praetor in 104, and of propraetor the following year, and the province of Cilicia was assigned to him. In 102 he was awarded a naval triumph on account of his great success against the pirates. As consul in 99 he opposed the agrarian laws of Titus, was censor in 97, and had a command in the Marsic War in 90. His execution was ordered on account of belonging to the party of Sulla, at the time when Cinna and Marius triumphed.

ANTONIUS, Marcus (Mark Antony), eminent Roman general, born in Rome in 83 B. C.; suicided in Egypt in 30 B. C. He was the grandson of Antonius, the orator, and a son of Antonius Creticus, and had the advantages of a liberal education. He attained early success as a soldier in Syria and Egypt, and fought in Gaul under Caesar, who was his firm friend. Subsequently he returned to Rome, where he married Fulvia, the widow of Clodius, gave hearty support to Caesar against Pompey, and was appointed tribune. In the war between Caesar and Pompey, he commanded reënforcements that were taken to Caesar, aided in the great victory of Pharsalia, and in 44 became Caesar's colleague in the consulship. After the assassination of Caesar, he, with Octavianus, afterwards Augustus, and Lepidus formed a government called the triumvirate, which fortified itself and defeated the army of Brutus and Cassius at Philippi. The division of Rome was now agreed upon, and the three military leaders were to share in the division. Gaul was to fall to Antony, Spain to Lepidus, and Sicily and Africa to Octavianus. A general proscription was agreed upon, under which their enemies were to be extinguished, among them Cicero, the great orator. Antony visited Athens and proceeded thence to Asia, where he met the beautiful Cleopatra, Queen of Egypt, with whom he fell in love, and neglected the government of his provinces, as well as his wife Octavia (q. v.). In 32 B. C., war was declared at Rome against the Queen of Egypt, and Antony was deprived of his consulship and government. In the Battle at Actium, in 31 B. C., Antony was aided by Cleopatra, but was utterly defeated. Being disappointed in his hope that the troops of Libya would remain faithful, he returned to Egypt, and there Octavianus again defeated him. Discouraged in battle and deceived by a false report regarding the safety of Cleopatra, he committed suicide by falling upon his sword.

ANTWERP (ănt'werp), the principal seaport of Belgium, capital of the province of Antwerp, on the Scheldt River, about fifty miles from the sea. It it strongly fortified, being encircled by outer fortifications and inner lines of defenses, and is the converging center of many important railroad lines that connect it with commercial cities of Belgium, Holland, France, and Germany. The surrounding country is a fertile and well cultivated region. It has extensive diamond industries and manufactures of machinery, textiles, silks, chemicals, leather, pottery, furniture, and canned and cured meats and fish. The city has important commercial relations with the leading ports of Europe, and is a point of departure for emigrants to Africa and America. Few cities of Europe rival it in the point of architectural beauty. Among its public buildings is a fine Gothic cathedral with a spire 400 feet high. This building contains the famous paintings of Rubens, entitled "The Descent from the Cross," "The Elevation of the Cross," and "The Assumption." The city has many hospitals, educational institutions, and public buildings, and supports a well-organized public school system. Gas and electric lights, numerous libraries, several fine parks and boulevards, and an extensive system of electric street railways are among the many improvements. Antwerp was a place of importance as early as the 11th century, and in the 16th century attained to large commercial trade relations, when it had a population of 200,000. Its commerce was greatly injured by wars between Spain and the Netherlands. In the last century it made wonderful growth, and is now a center of wealth, intelligence, and industrial activity. The Flemish language (Low German) is spoken generally. It was captured after a siege by the Germans on Oct. 9, 1914. Population, 1921, 322,980.

ANUBIS (ȧ-nū'bĭs), or **Anepu**, a deity of of the Egyptians, the son of Osiris and Isis. It was supposed that he opened the paths which lead to Heaven, hence was the god of embalming and of funeral rites. He is represented in human form with the head of a jackal, which the Greeks mistook for the head of a dog. In later times his worship spread to Greece and Italy, and in the latter country he was confounded with Hermes.

ANVIL (ăn'vĭl), an iron block with a steel surface on which metals are hammered and shaped. The common blacksmith's anvil is usually built of six pieces, which are welded to a central *core* or *body*, and has four corner pieces, a projecting end, and a conical end, or *beak*, for hammering curved pieces of metal. The projecting end has a square hole for the reception of a chisel, thus serving to facilitate punching holes in iron plates. The anvil is usually placed on a large wooden block. Heavy anvils for forging shafting and large portions of implements are placed on piles of masonry.



ANVIL.

AORTA (ȧ-ôr'tȧ), in anatomy, the great arterial trunk from which branches proceed to penetrate the whole system. It rises from the left ventricle of the heart, where it is called the *ascending aorta*, then makes a curve called the *arch of the aorta*, from which branches pass to the head and other upper extremities. It then passes toward the lower extremities, where it is called the *descending aorta*. From this part and farther down innumerable branches proceed to the trunk and lower extremities, where, as elsewhere, minute branchlets ramify the different parts of the body.

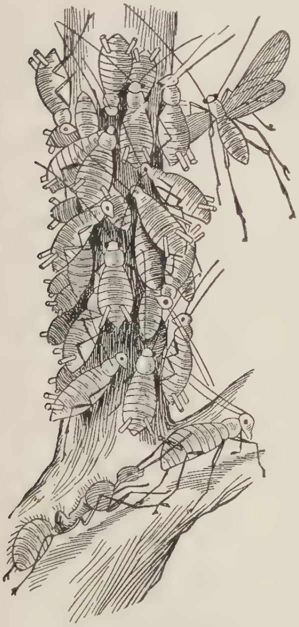
APACHES (ȧ-pä'chȧz), a warlike tribe of North American Indians now principally resident in Arizona, New Mexico, and parts of Mexico, where they settled many years ago, after emigrating from the vicinity of Great Slave Lake in Canada. They harassed the pioneer settlers and government troops for many years, but civilization is steadily benefiting them, and large numbers have taken advantage of educational facilities provided by the government. Antonio Apache, a highly educated Apache Indian, held an official position in the department of anthropology at the World's Columbia Exposition in Chicago in 1893. The total number of Apaches, in 1920, was 5,150.

APATITE (ăp'ȧ-tīt), a mineral found in the older crystalline rocks, consisting of phosphate mixed with fluoride and chloride of calcium. Deposits are found in many parts of the world, being abundant in Canada, the United States, and Europe. This mineral is important as a source of fertilizer.

APE (āp), an animal closely allied to the monkey, and in structure nearly approaching the human race. The word *ape* was formerly applied to all monkeys, but is now limited to the species that possess a manlike form and appearance. The principal kinds of apes are the orang-outang, chimpanzee, gorilla, and gibbon. These are classed as *anthropoid apes*, owing to their manlike structure. Their toes and fingers are very similar and much like human hands, by the aid of which they can swing from trees with much ease, but they are quite helpless when on the ground. The brain structure is similar to that of man, but it is only half as large. The food consists chiefly of fruits and the tender part of plants. They are native to Africa, Borneo, and the warmer parts of Asia.

APELLES (ȧ-pĕl'ēz), a famous painter of ancient Greece who lived at Colophon in the 4th century B. C. He probably was born at Colophon, and was the son of Pytheas, also a painter. His first instruction was received at Ephesus, in Asia Minor, then a rival of the Grecian school at Sicyon. Later he studied at Sicyon under renowned teachers, and thus united the fine coloring of the Ionians with the accuracy in drawing taught under the Sicyonic teachers. He accompanied Alexander the Great on his expedition to Asia as far as Ephesus, where he settled. It is said that he drew inspiration from the beauty of Lais, as she drew water from the fountain of Peirene, and from the notorious Phryne, bathing in the Eleusis. His most noted production was "Venus Rising from the Sea." A painting made by him, in which Alexander was represented holding a thunderbolt, was valued at $200,000. It is said that a cobbler adversely criticised one of his paintings because a shoe drawn by him contained some error, upon which he corrected it. Soon after the cobbler found fault with the drawing of a leg, to which the artist replied, "Let not the shoemaker go beyond his shoe." From this remark the well-known adage came into general use.

APENNINES (ăp'en-nīnz), an extensive range of mountains in the Italian peninsula, extending from the Maritime Alps to the Strait of Messina. They form the principle watershed of Italy. The Apennines are considered the southern branch of the great Alpine system of Europe, and are separated from other ranges in the vicinity of Genoa. Their length is about 800 miles, the average height is about 4,000 feet, and the highest peak, Monte Corno, near Aquila, is 9,580 feet above sea level. This range does not reach the limits of perpetual snow, owing to the mild climate of that section of Europe. The geological formations include immense limestone rock, and they are exceeding rich in the finest marbles and metal ores. Several of the mountains are volcanic, including Mount Vesuvius, which is the most active and noted of Europe. The slopes, even to a comparatively high altitude, are covered with abundant vegetation, while the summits are sterile.



ANT AND APHIDES.

APHIS (ā'fĭs), an insect commonly known as the plant louse. Many widely different species have been described. They propagate in large numbers, are soft, round-bodied, and carry a long beak coming from between the fore legs, from under the head, which is used to suck the juice of plants. The aphides are taken as food by the larvae of the ladybird. Some species are pursued by ants for a saccharine liquid that contains a large portion of sugar, and of which they are very fond. This liquid is called *honeydew* and is secreted at the posterior end of the abdomen, from which it exudes a drop at a time. Its purpose is to supply food for its young. Tobacco is used as a means to protect plants against the ravages of these insects.

APIA (ȧ-pē'ȧ), a town in the Samoan Islands, on the island of Upolu, which is a possession of Germany. It has a good harbor and is the most important commercial center of the Samoan group. The chief buildings include several schools, a Roman Catholic church, and the government house. It has a good trade in cotton, copra, tobacco, and fruits. Population, 1922, 3,750.

APIARY (ā'pĭ-ȧ-rȳ), a shed or stand for keeping bees, commonly constructed to protect bees from extremes of weather and temperature. In cold regions the apiaries are built so as to face toward the south or southwest, for the purpose of utilizing to the best advantage the warmth of the sun during the winter season. In the summer months the hives are set out in the open air near good feeding ground, as clover fields, gardens, or flowering heaths. Apiaries are not generally maintained in regions having a warm climate, but they are quite necessary to bee-keeping in the colder sections. See **Bee.**

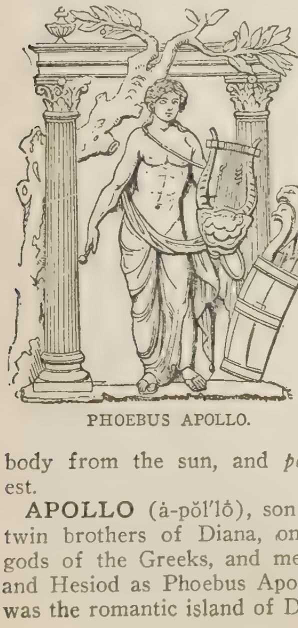
APIS (ā'pĭs), the bull regarded sacred by the ancient Egyptains, and long worshiped as a symbol of Osiris, the husband of Isis. The day of his birth was kept as an annual festival, and his death was a season of public mourning. This animal was not allowed to live to exceed twenty-five years, and on attaining that age was killed and embalmed. The type by which Apis was represented is that of a human mummy containing the head of an ape. Figures in bronze, stone, and porcelain were common in all cities, and many made of the first two mentioned materials are still abundant.

APOCALYPSE (ȧ-pŏc'a-lĭps), a name applied frequently to the last book of the New Testament. In the English and most languages it is called the "Revelations of Saint John the Divine," and it is supposed to have been written by John the Apostle, but its authorship is much disputed. Those who assign it to the Apostle John think it was written while he was on the Isle of Patmos, about 95-97. A large part of it is devoted to predictions respecting the future of Christianity.

APOCALYPTIC NUMBER (ȧ-pŏk-ȧ-lĭp'tĭk), the number 666, based on Rev. xiii, 18: "Let him that hath understanding count the number of the beast: for it is the number of a man; and his number is Six hundred threescore and six." In the 2d century it was discovered that the name *antichrist* was contained in the Greek characters expressive of this number, while it was held by some to express a date. The Roman nation was the most powerful pagan government, was the most mighty representative of antichrist, and its name is spelled in Greek by characters in which the number 666 appears. Some Protestants apply the prophecy to papal Rome, while it is applied by others to reformers of other denominations for, perhaps, no better reasons.

APOCRYPHA (ȧ-pŏk′rĭ-fȧ), the term applied to professedly inspired writings, and sometimes to those whose public use was not thought advisable. It is used especially to designate books written in the two centuries preceding the birth of Christ, and which are omitted from the majority of Bibles now in use. These books include a total of fourteen, and, when published at all, usually appear in the Bible in the following order: I Esdras; II Esdras; Tobit; Judith; the Additions to the Book of Esther; the Wisdom of Solomon; the Wisdom of Jesus, the son of Sirach, or Ecclesiasticus; Baruch; the Song of the Three Holy Children; the History of Susanna; the History of Bel and the Dragon; the Prayer of Manasses, king of Judah; the First Book of the Maccabees; and the Second Book of the Maccabees.

APOGEE (ăp′ȯ-jē), a term used in astronomy to denote the point occupied by the moon at which, in its course of revolution, it is at the greatest distance from the earth. The ancients regarded the earth as the center of the solar system, and used the term apogee to designate the point most remote from the sun. When the sun became recognized as the center, the expression for this relation was changed, and the term *aphelion* is used instead. Apogee is now used to express the greatest distance of the moon and the planets from the earth, and *perigee* the nearest. Aphelion expresses the greatest distance of any heavenly body from the sun, and *perihelion* the nearest.



PHOEBUS APOLLO.

APOLLO (ȧ-pŏl′lȯ), son of Zeus and Leto, twin brothers of Diana, one of the principal gods of the Greeks, and mentioned by Homer and Hesiod as Phoebus Apollo. His birthplace was the romantic island of Delos, in the Aegean Sea. He was regarded the god of the sun and of song, the revealer of the future, the god of the flocks, the archer of vengeance, and the protector of the muses. In song and statuary he was represented as a youth of purity, spiritual light, and poetical excellence. His long hair was entwined with the leaves of the sacred baytree, and he bore the lyre or the bow. His worship was commenced at Rome in the time of the Tarquins, and temples, in which games were given in his honor, were built. The most remarkable ancient statue of Apollo that has come down to us is now in the Vatican at Rome, and is called the *Apollo Belvedere,* so named from the Belvedere Gallery.

APOLLONIUS OF TYANA (ăp-ŏl-lō′nĭ-ŭs of tȳ′ȧ-nȧ), philosopher, born at Tyana, in Cappadocia, and lived about 30-90 A. D. He traveled entensively and went to India to study the doctrines of the Brahmans, and on returning to his native town acquired a high reputation as a sage and philosopher. Philostratus wrote his biography, and Hierocles, an opponent of Christianity, is author of a work on the life and doctrines of Apollonius.

APOLLONIUS OF TYRE, the hero of a romance of Greek origin. The original writing is lost, but a Latin version made the romance popular in the Middle Ages. Apollonius, a Syrian prince, it is related, had romantic adventures before his marriage with the daughter of King Alcistrates, of Cyrene, and later with his wife and daughter Tarsia. The romance depicts these adventures in an interesting manner. It is said that he became separated from his wife, who was parted from him by apparent death, and that his daughter was carried to Mytilene by pirates. The story closes with an interesting chapter on the happy reunion of the family. Shakespeare secured from it the plot for his "Pericles, Prince of Tyre."

APOPLEXY (ăp′ȯ-plĕks-ȳ), a serious malady that comes on suddenly, causing a loss of sensation and voluntary motion. A stroke of apoplexy suspends the functions of the cerebrum by a pressure on the brain, caused by a rupture of blood vessels or a congestion of the blood. It is accompanied by loss of the intellect or thought, while respiration and the action of the heart and of the general vascular system continues. In a severe stroke the person falls suddenly and gives no proof of consciousness. Persons at the age of from fifty to sixty are the most subject to it. Among the causes leading to apoplexy are continued anxiety, frequent indulgence of temper and passion, intoxication, luxurious living, and intense thought. Out of a large number of patients, carefully examined, only six per cent. were corpulent, thirty per cent. were thin, and the others were of ordinary form. Recovery after one or two attacks is quite common, but persons afflicted more than twice are almost certain to fail of recovery.

APOSTLES (ȧ-pŏs′s’lz), meaning a person sent, a term applied to the twelve men whom Jesus selected to aid Him during His ministry and to preach the gospel. They were chosen by Him promiscuously from among fishermen and others engaged in the more common occupations. The twelve were as follows: Simon Peter; James; John; Andrew; Philip; Thomas; Bartholomew; Matthew; James, the son of Alpheus; Lebbeus, or Thaddeus; Simon; and Judas Iscariot. On account of Judas Iscariot’s betraying Christ, Matthias was chosen in his place, and later Paul and Barnabas are spoken of as apostles of Jesus. These apostles were commended by Jesus to preach the gospel, at first to the Jews, but a short time before his ascension they were instructed to preach to all nations. The day of Pentecost was the occasion when they received miraculous gifts for the public ministry. The chief events in the lives of the apostles are recorded in the Epistles and Acts of the Apostles. In a wider sense, the early Christian preachers sent to heathen countries are termed *apostles,* but usually, when speaking of the apostles, those named above are implied.

APOSTLES’ ISLANDS, a number of small islands in Lake Superior, near the western end, first settled by the French in 1680. They consist of twenty-seven islets and islands, and have an area of 200 square miles. Mandeline Island is the largest of the group and on it is the town of La Ponte. The islands have deposits of a fine quality of brownstone, which is quarried and shipped. For governmental purposes they belong to the State of Wisconsin.

APOSTOLIC FATHERS (ăp-ŏs-tŏl′ĭc), the name given to the disciples and fellow-laborers of the apostles, especially those who are supposed to have left writings. These writings are looked upon as a continuation of the epistles written by the apostles, but in form and contents are quite inferior to their predecessors. The essence and main purpose is to exhort to faith and holiness. The list of apostolic fathers include Barnabas; Clement of Rome; the Shepherd of Hermas; Ignatius, Bishop of Antioch; Papias of Hierapolis; and Polycarp, Bishop of Smyrna. Diognetus is sometimes included with the above list.

APOSTOLIC SUCCESSION, the uninterrupted succession of bishops, priests, and deacons from the time of Christ to the present day. It is considered essential and is observed strictly by the Anglican, Greek Catholic, and Roman Catholic churches, who do not consider the ordination of ministers or priests legitimate unless it is by a bishop.

APOTHECARIES’ WEIGHT (ȧ-pŏth′ē̇-kā̇-rĭz), the system of measurement used in dispensing drugs. The pound contains twelve ounces, the ounce eight drams, the dram three scruples, and the scruple twenty grains. The grain is equivalent to that used in avoirdupois weight.—Apothecary, one who keeps a store or laboratory for preparing, compounding, and selling medicines, and for compounding prescriptions. In early times, even as late as the 17th century, apothecaries ranked with the grocers, but in the 18th century they were placed on a higher standard. In most countries laws have been enacted for the purpose of regulating the practice of compounding medicines. A person who engages in this line is called a *pharmacist.* He is usually required to hold a certificate showing that he is duly authorized by law to make up prescriptions and is qualified for such duties. The name *druggist* is usually applied to one who keeps a drug store.

APPALACHIAN MOUNTAINS (ăp-pȧ-lā′chĭ-an), a vast system of elevations in the eastern part of North America, located partly in Canada, but mostly in the United States. The system consists of a number of nearly parallel chains extending from the Saint Lawrence River to Alabama and Georgia. It is highest in the north and south and slopes gradually toward the middle. Its length is about 1,300 miles and its breadth varies greatly in the different portions. Between the mountain system and the Atlantic Ocean stretches a fertile slope, known as the Atlantic Coast Plain, which is from fifty miles in breadth in New England to two hundred miles in the South. In the North are the Adirondacks, the Green Mountains, the White Mountains, and others; in the central portion, the ranges of the Blue Ridge, and the Alleghanies; in the southern, the ranges of the Blue Ridge, Black Mountains, Smoky Mountains, and others. The elevation of the system is from a few hundred to 6,500 feet above the level of the sea, though none of the higher peaks reaches the snow line, and the average height is about 2,500 feet.

The Appalachians are the source of a large number of rivers, and form the divide between those that discharge into the Atlantic Ocean and the eastern tributaries of the Mississippi River system. These highlands contain but one large body of water, Lake Champlain, which is located between the northern part of New York and Vermont, and has its outlet into the Saint Lawrence River. The mountains are covered entirely with vegetable growth and contain many fertile valleys. Near them have developed many of the large manufacturing cities and commercial centers of North America, due partly to their closeness to the sea coast, and partly to the large variety of rich minerals which these mountains contain. They yield, perhaps, the best anthracite coal in the world, and supply vast quantities of petroleum, gas, and iron. Besides, there are extensive deposits of other minerals, including lead, copper, marble, gypsum, salt, gold, silver, and bituminous coal. The forests yield many varieties and large quantities of valuable timber, consisting chiefly of white birch, beech, ash, sugar maple, walnut, cherry, and yellow pine. The timber product, of course, depends upon the altitude and latitude. In the northern part are the hardy varieties common to colder regions, while in the South abound magnificent forests of trees common to a southern climate, both sections yielding enormous quantities for manufacturing purposes. The wild animals have been largely extinguished, but in some localities the bear, panther, wild cat, and wolf still haunt the forests.

APPALACHICOLA (ăp-ȧ-lăch-ĭ-cō'lȧ), or **Apalachicola,** a river in the United States formed in Georgia by the junction of the Flint and Chattahoochie rivers. It flows southward through Florida and discharges into Appalachicola Bay, an inlet from the Gulf of Mexico. The entire course of ninety miles is navigable for steamboats. Near the mouth is the city of Appalachicola, the county seat of Franklin County.

APPALACHICOLA, a city in Florida, county seat of Franklin County, 85 miles southwest of Tallahassee. It is located near the mouth of the Appalachicola, on Saint George Sound, and is important as a port of entry. The chief exports are lumber, fruit, and naval stores. Population, 1900, 3,077; 1920, 3,066.

APPEAL (ăp-pēl'), in law, the removal of a cause from an inferior court for the purpose of obtaining a review of the suit or a reversal of the decision. A writ of error and a certiorari differ from an appeal in that they merely bring up for review the questions of law involved in the proceedings of the lower court, while both questions of law and fact may be reëxamined by an appeal. The rules under which appeals may be granted differ in the system of courts in different countries, but usually require that error be shown in the conduct of the trial, or that additional material evidence be presented.

APPENDICITIS (ăp-pĕnd-ĭ-sī'tĭs), a term used to denote inflammation of the vermiform appendix, a wormlike pouch or cavity projecting from the first part of the colon. In man it is small. It attains its largest size in such herb-eating animals as the horse, in which it is twice the size of the stomach. In man it has no definite function, and may be removed without any harm to the system. Appendicitis frequently results from cherry stones and round objects stopping in it, often causing death, if the patient is not operated upon by a skillful physician.

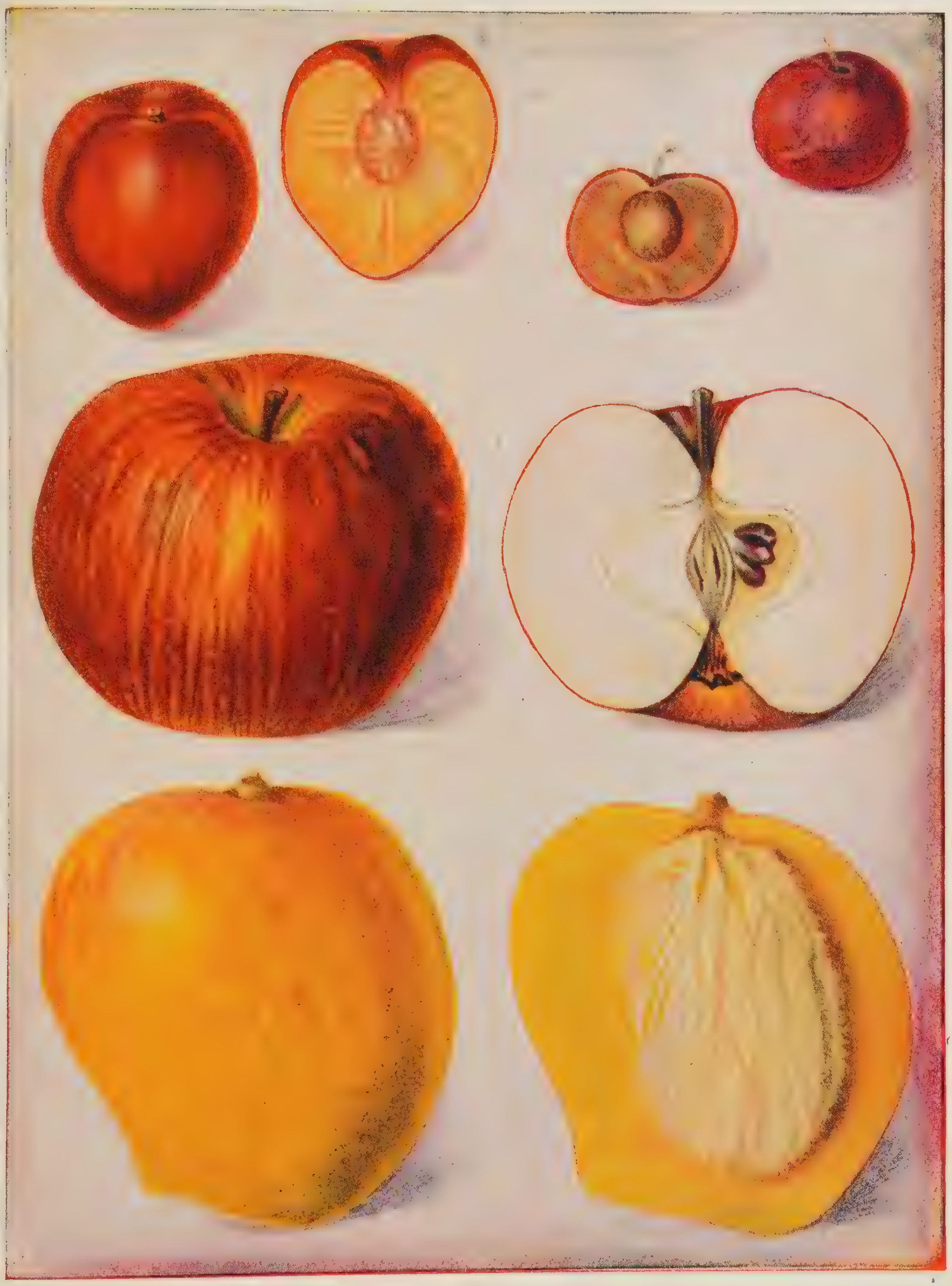
APPERCEPTION (ăp-pẽr-sĕp'shŭn), a term employed in the study of mental science, and first used by Herbart, Kant, Liebnitz, and others. It is now a familiar term among teachers, and denotes a perception obtained by reflecting upon new elements of knowledge and comparing them with others previously obtained. In other words, the action of the mind upon a new idea is influenced by the masses of ideas the mind already has, and from this spring new ideas. Such action has come to be called *apperception.*

APPETITE (ăp'pē̇-tīt), a term used to denote the natural desire for something, mainly the desire for eating and drinking. It is stimulated by exercise, work, cheerfulness, and plain living. A defective appetite is due generally to vicious habits, diseased action of the stomach, impaired nervous system or circulation, and general debility. A depraved appetite results from unnatural food, excessive eating, and other causes. The technical meaning of appetite is, *I desire.* It is attended by two conditions: a desire of the stomach relieved by taking food, and state of the body changed as soon as the blood begins to take up the products of digestion. These are not yet accurately understood.

APPIAN WAY (ăp'pĭ-an), a famous road that connects Rome with the southern part of Italy. It was constructed mainly during the censorship of Appius Claudius Caecus, between the years 312 and 307 B. C. The course from Rome to Terracina is nearly straight, although the Pontine Marshes and the Alban Mountains made construction difficult. It was paved with large square stone and adorned with numerous magnificent sepulchers, the most noted of which were those of the Scipios and of Caecilia Metella. Pius IV. partially restored it, and in 1852 it was excavated as far as the eleventh milestone from Rome by Pius IX., near which it is now crossed by a railroad.

APPIUS CLAUDIUS CRASSUS (ăp'pĭ-us cla̤'dĭ-ŭs crăs'sus), a Roman decemvir of the 5th century B. C. He formed a compact with several colleagues to maintain their authority in Rome by force and strategy, but the people soon became incensed against them. Appius Claudius had formed a passion for Virginia, the daughter of Lucius Virginius, who was absent with an army in the war with the Sabines. The young Virginia was forcibly detained under a claim that she was the daughter of one of the clients of Appius Claudius. Her father was hastily summoned from the army to rescue his daughter, and, being unable to do so and to save her from disgrace, stabbed her to the heart. Appius Claudius was deposed by the people in the year 449 B. C. and died in prison.

APPLE (ăp'p'l), a tree of the rose family of plants, native to the temperate region of Asia and Europe. It has been grown for its fruit since prehistoric times, and brought to America by settlers from England in the early history of this country. The tree has spreading branches, and attains a moderate height, seldom exceeding thirty feet. The wild crab apple of Europe is the parent of all the varieties now grown. These have been largely improved by ingrafting and naturalization. There are three general



(Opp. 120)

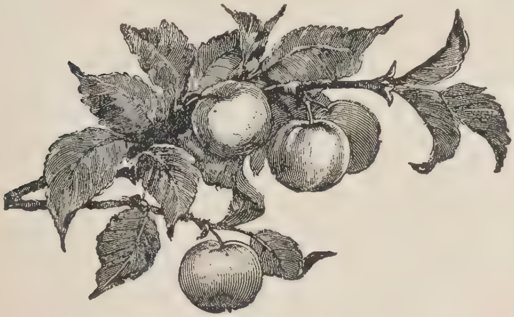
EDIBLE FRUITS.

Moncelt Plum.
Lowry Apple.

Laire Plum.
Peter's Mango.

Notice the seed and the interior structure.

classes, summer, autumn, and winter apples, and in each class are many varieties, perhaps 200. Many of the best known varieties are designated by names, as winesaps, Danver's, Jonathan, pippins, Ben Davis, willow twigs, Duchess of Oldenburg, etc. Apples are cultivated extensively in Southern Canada and in nearly every section of the United States. They are especially productive in the middle Atlantic section, though fine orchards are common to the Mississippi Valley and the Pacific Coast.



APPLE.

The wood of the apple tree is hard, durable, and fine-grained. Some varieties of crabs are planted both for ornamental purposes and for the production of fruit. Besides being a wholesome food when ripe, the apple is used for many purposes in cooking, baking, preserving, and for jelly. From it is made a fermented liquor, called *cider,* and a fine quality of *vinegar.* By distillation a kind of spirits is manufactured. It is used for preparing compounds that have good medicinal qualities. Apples are important articles of commerce, great quantities being produced and exported to domestic and foreign markets in cases and barrels.

The seedless apple was evolved by propagation at Grand Junction, Colo., by John F. Spencer, who conducted experimental researches for several years and succeeded in producing five trees that bore seedless, coreless, and wormless apples, and from this little group there were budded two thousand more trees, which, in 1905, constituted the entire seedless apple stock of the world. This variety of apple trees has many peculiarities. While there is a stamen and a small quantity of pollen, exactly as in the blossom of the ordinary apple tree, yet the flower itself is missing, and several small green leaves grow around the apple to shelter it. The meat of the new apple, like that of the seedless orange, is quite solid, and at the navel end is a slightly hardened substance. In size these apples are of the usual average, of good flavor, and will keep well. The fact that the tree is flowerless renders it more hardy at the time of late frosts, and overcomes, to a large extent, injury by insects, since there is no place for the codling moth to lay its eggs.

APPLE OF DISCORD, in Greek mythology, the golden apple thrown by Eris into the midst of an assembly of the gods, at the marriage of Peleus and Thetis. It was intended "For the most beautiful," and was claimed by Juno, Venus, and Minerva, and Paris was chosen to decide the dispute. The award was given to Venus, which caused Juno to become inflamed with jealousy and hatred toward the Trojans.

APPLETON (ăp'p'l-tun), a city of Wisconsin, county seat of Outagamie County, on the Fox River, about 120 miles northwest of Milwaukee. It is on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railways, has a growing trade in merchandise, and is surrounded by a fertile farming and dairying region. The manufactures include paper, knit goods, furniture, machinery, clothing, tobacco products, and farming implements. Water power for manufacturing purposes is obtained from the Grand Chute Falls of the Fox River. The city has an excellent system of public schools, numerous churches, and is provided with extensive lines of street railways. It has modern conveniences, such as gas and electric lights, pavements, public parks, several libraries, and an extensive system of waterworks. It is the headquarters of a Lutheran life insurance and endowment company. The first settlement was made in 1840 and it was incorporated in 1857. Population, 1920, 19,561.

APPLETON, Daniel, publisher, born in Haverhill, Mass., Dec. 10, 1785; died in New York City, March 27, 1849. His first publication consisted of a collection of religious tracts, entitled "Daily Crumbs from the Master's Table." This met with favorable reception, and other publications followed in rapid succession. He retired from the establishment, the publishing house of D. Appleton & Co., in 1848, leaving the business to four sons and their descendants. This institution has produced a large number of valuable and extensive works, has several branch establishments, and is one of the best known publishing houses in America. Daniel Sidney Appleton (1824-1890), son of Daniel Appleton, was long a successful member of the firm. He graduated at Yale College in 1843, and for many years had charge of the London branch office.

APPLE-TREE BORER, an insect native to America, and a common plague to apple and crab apple trees. It also attacks the mountain ash, pear, and quince trees, and does considerable damage to orchards. The larva of the insect is the borer, and when full grown is an inch long. It has a light yellow color and chestnut-brown head, and the jaws are a deep black. The best preventive is an alkaline wash, though soft soap mixed with lye made from wood ashes, applied to the base of the tree, serves practically the same purpose. This pest should be early exterminated from orchards so as to prevent its spread.

APPOMATTOX COURTHOUSE (ăp-pō-măt′tŏks), formerly a village of Virginia, in Appomattox County, now called West Appomattox. It is situated twenty-three miles east of Lynchburg, on the Norfolk and Western Railroad, and is the county seat of Appomattox County. At this place was fought the final battle between the Confederates under Lee and the Federals under General Grant. Lee's army was retreating as rapidly as possible, but was met by General Custer, who fought the wearied Confederates till dark. On the following day, April 9, 1865, as Sheridan was preparing for a charge, a white flag was raised, and General Lee surrendered his army, numbering 27,805, to General Grant. This was the close of the Civil War, and the terms of the surrender accepted by General Grant included that Lee's officers and men should be released on parole and retain their horses, for, said he, "They will need them for spring plowing and farm work." The old courthouse building was destroyed by fire in 1892. In 1920 West Appomattox had a population of 498; Courthouse district, 1920, 4,314.

APRICOT (ā′prĭ-kŏt), a fruit of the plum order, though resembling the peach. It was first brought to Greece in the time of Alexander the Great from countries farther east, probably from Armenia, where it is native. It is now extensively cultivated in the warmer parts of the temperate zone and in subtropical countries. The tree is of low and crooked growth, usually attaining a height of twenty or thirty feet. Its habit of blooming early renders it liable to damage by frosts in the spring, but it is fully as hardy as the peach. It can be propagated by budding and grafting on peach, plum, and wild cherry stocks. The fruit is an important article of commerce. It is preserved in cans or dried and shipped in boxes. The Pacific coastal region supplies a large portion of the markets of America with this fruit, its culture being an extensive industry in that section, both in Canada and the United States.

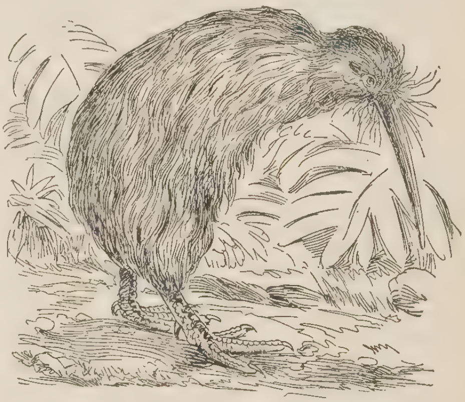
APRIL. See **Month.**

APRIL FOOLS' DAY, the name used to designate the 1st day of April. Custom has established this day as a time to send a person on a bootless errand, such as for horse milk, for the saddle of a nightmare, or to inform him there is a spot of mud on his face. When the person investigates he is laughed at and called an April fool. This practice is known in all civilized countries, but all do not observe the same day. In Hindustan the 31st day of March is set apart for this practice, at which time the Hindus celebrate the Kuli festival.

APSE (ăps), a term used by the Greeks and Romans to designate the projecting semicircular part of a building, or to describe a domical chamber and other vaulted structures. The interior was richly decorated and the most sacred subjects were placed on its walls and in the semidome. In temples the apse contained the cult image of the god, and in the basilica was the tribunal of the praetor, who sat in the center and was surrounded by his assessors. In later times the apse entered into the architecture of Byzantium and was adopted as a part of the architectural structure of Christian churches. The exterior of the Byzantium apse was polygonal in form, but the interior remained semicircular. In Christian churches it was modified both in size and structure, and in many cases the central apse was surrounded by smaller ones called *apsidoles,* and sometimes the church was provided with a double apse, one at each end of the building.

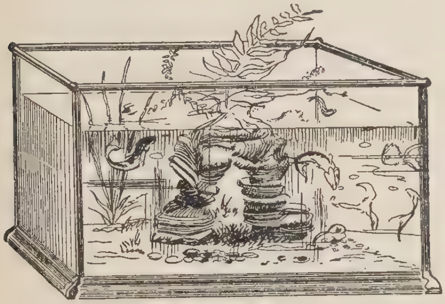
APSIDES (ăp′sĭ-dēz), the ends of the longest diameter of a heavenly body, applied chiefly to a planet, but frequently to a comet or a satellite. The apsides are the two extreme points in the orbit of a planet, one the nearest to and the other the farthest from its primary; a line drawn between the points is the major axis of the orbit, or the *line of apsides.* These points move slowly forward in the same direction in which the revolving body moves.

APTERYX (ăp′tē-rĭks), a running bird of New Zealand, belonging to the family which includes the emu, cassowary, and ostrich, but distinguished from the last mentioned by having three toes instead of only two. It is wingless and tailless, and possesses a hairlike plumage. The nests are built in a hollow tree, or in deep holes in the ground, and it feeds on worms, insects, and seeds. From its cry, kiwi-kiwi, it is given that name by the natives. It is fast decreasing in number and probably will be extinct ere long.



APTERYX.

AQUARIUM (ȧ-kwā′rĭ-ŭm), a tank or vessel in which marine or fresh-water plants and animals are kept in a living state. The fresh-water aquarium may be provided with a fountain to supply a change of water, or plants and animals may be kept in the proper proportion and the life of both sustained. It was long thought necessary to change the water frequently so as to sustain the life of the fish and other water animals, because when water animals breathe they give out carbonic acid and use up oxygen, just as land animals do, which renders water impure in a short time. But in 1836 M. Charles des Moulins, a Frenchman, discovered that if water plants are put into the same tank with animals they will take up the carbonic acid and give up the oxygen which the animals need. In this way the water may be kept pure and no change is needed. It has been found that salt-water plants can be kept as successfully and in the same way. As a result large aquariums have been established in cities for ornamentation and the study of both plants and animals. Many governments maintain aquariums as a source to study fish and other animal life, and through these means numerous streams and lakes have been populated with fish and other animals valuable for food and commerce. At the Columbian Exposition at Chicago in 1893, the Louisiana Purchase Exposition at Saint Louis in 1904, and other expositions held in the United States, the government made exhibits by demonstrating the practical propagation of many kinds of fishes. At these expositions were eggs of fish in different stages of hatching, and young fish from one day to several months old could be examined and studied by those in attendance.



FRESH-WATER AQUARIUM.

Aquariums on a large scale are maintained in many public parks for amusement and profit, and the animals treated quite the same as those kept in small tanks for ornament and study in the homes. The Battery, in New York City, formerly known as Castle Garden, has one of the largest aquariums in the world. It contains about 150 tanks, in which are small and large fish, turtles, alligators, and other aquatic animals. Many of the tanks are lighted from above and in the rear by electricity. Brighton, Paris, and Hamburg have large aquariums. In the one at Brighton are 125,000 gallons of water confined in a tank 125 feet long and 100 feet wide, which is covered by a plate glass, through which may be studied the form and habits of very large fish. Other great aquariums are located at Saint Petersburg, and in many natural parks in the United States. The aquarium at Saint Petersburg has been maintained over 150 years.

AQUARIUS (ȧ-kwā′rĭ-ŭs), or **Water-Bearer,** the eleventh sign of the zodiac, into which the sun enters about the 20th of January. The same name is applied to a constellation which was in the sign Aquarius at the time when the signs were named, but which, by the precession of the equinoxes, now occupies the sign Pisces.

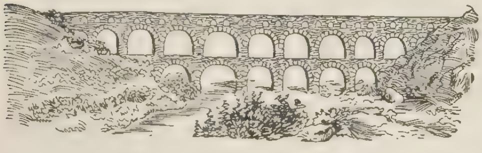
AQUATIC ANIMALS (ȧ-kwăt′ĭc), a term applied to the animals that live in water, or frequent the water in quest of food. This class of animals is very numerous, including the fishes, whales, and dolphins, which live entirely in the water; many birds, reptiles, and mammals, such as the otter and the beaver, which frequent the water for subsistance; most of the mollusca; and many tribes of the articulata and radiata. The animals that live in and habitually frequent water are more numerous than those of the land. The structure and character of animals are influenced by their environments, and in this respect are quite analogous to plants.

AQUATIC PLANTS, the plants which live either entirely or partially immersed in water, or which require a preponderating quantity of water as the condition of their existence. Flowerless aquatic plants are more numerous than those that have flowers, and species of the lower types of organism are more abundant than the forms classed with the higher vegetable organisms. Some are entirely in water, as the algae (q. v.), and perform all their functions when submerged, while others are rooted to the ground and have their flowers and part of their foliage above the surface of the water. Some of the seaweeds and plants common to inland waters are provided with air bladders which serve to brace the stem and hold the leaves above the surface, while others, if torn up by the roots, or even if parts of the plant are severed from the main body, continue to grow and multiply. The cat-tail, or bulrush (q. v.), is a notable example of aquatic plants. Others are the water lily, the American lotus, the arrowhead, and the water hyacinth.

AQUEDUCT (ăk′wē-dŭkt), an artificial course or channel by which water is conveyed from one place to another by the force of gravity. Popular usage has limited the name to conduits built of masonry, such as are used in conveying water to supply large cities, and it does not include the pipes and ditches commonly utilized in mining and in irrigation. The practice of conveying water by aqueducts was in use in times far remote, and was well established in Judaea, Babylon, Persia, and many other countries of Asia. In Peru the Incas constructed aqueducts similar in many respects to those of modern times. In Rome such works were maintained in many parts of the dominion. The city of Rome secured a water supply by means of twenty-four aqueducts, extending many miles, and having a capacity sufficient to supply the entire city. Their construction was usually on a regular descent, winding through hills, crossing valleys by means of great arches, and in many places even passing by tunnels through mountains.

Modern cities utilize aqueducts, but their construction is changing to a somewhat different plan. Instead of building them on a regular descent so the water may flow entirely by gravity, they are built in part of pipes through which large volumes of water are forced by steam or electric power. In New York City the Croton aqueduct, which supplies the greater part of the city with water, is about forty miles long. The water is conveyed through sixteen tunnels, many of them cut through solid rock. The Harlem River is crossed by a granite arched bridge 1,400 feet long, across which the water is conveyed in three large pipes. The water is carried into reservoirs in Central Park, and is piped from there through many parts of the city. At Boston the Cochituate aqueduct, which is fifteen miles long, supplies a large quantity of water, but the city has additional sources. San Diego, Cal., has an aqueduct or conduit built of redwood, thirty-five miles long, by which the water is conveyed from the mountains.

In recent years the development and application of pipes for conveying water under pressure, buried beneath the soil, have displaced to some extent the building of massive structures of masonry for that purpose. Some very extensive pipe lines, from twenty to fifty miles long, are used in many cities. Rochester, N. Y., is supplied in this way. Saint Louis has conduits that convey water to Bissell's Point, from which the city secures its supply. In many localities conduits of masonry are carried through hills and the valleys are crossed by iron pipe lines. Chicago and many cities secure their supply of water from the Great Lakes by means of tunnels. In most cases a large iron shaft is constructed several miles into the lake, and the water is pumped into a central well, from which it is forced through pipes to all parts of the city. Aqueducts are used in hydraulic mining. The water is conveyed from reservoirs far up a river or smaller stream, or from a high point in the mountains, so as to obtain a working head of several hundred feet. The expense of these enterprises is marvelous. The Croton aqueduct of New York cost over $20,000,000, and many others cost as much.



AQUEDUCT AT NIMES, FRANCE.

AQUEOUS HUMOR (ā'kwē-ŭs hū'mẽr), a waterlike fluid that occupies the space between the cornea and the crystalline lens of the eye. The iris partially divides it into an anterior and posterior chamber, of which the former is the larger. The aqueous humor is almost pure water; only about one-fiftieth part of the whole consists of other constituents, of which fully one-half is chloride of sodium.

AQUILA (ä'kwē-lä), a city of Italy, capital of the province of Abruzzo Ulteriore, situated about fifty miles northeast of Rome. It was founded by Emperor Frederick II. in 1240, and is noted for ancient ruins found in its vicinity. It has railroad connections with seaport cities on the Adriatic. The chief manufactures are wine, textiles, and earthenware. A destructive earthquake in 1703 caused the death of about 2,000 persons. Aquila is noted as the birthplace of Sallust, the historian. Population, 1922, 21,188.

AQUINAS (ȧ-kwī'nȧs), **Saint Thomas**, theologian, born near Aquino, Italy, in 1227; died March 7, 1274. He joined the order of Dominican monks about 1243, and taught and preached at Paris, Pisa, and Rome. The most important of his works is entitled "Sum of Theology," and is regarded as one of the most complete compendiums of scholastic divinity. He was the founder of a sect of Catholics that came to be known as Thomists. John XXII. canonized him in 1323.

ARABESQUE (âr-ȧ-bĕsk'), an Arabian style of architecture employed by the Arabs and by the Moors in Spain. Decorations in this style were used extensively in the Alhambra (q. v.) and by Raphael in the Vatican. The decorations consist mainly of scrolls and geometric devices, and in many of the buildings fruit, flowers, and leaves are mingled with the genii and animals.

ARABIA (a-rā'bĭ-a), the name of an extensive peninsula in the southwestern part of Asia. It is about 1,500 miles long and 750 miles wide, and has an area of about 1,150,000 square miles. This vast region is not well known to geographers and the area is variously estimated. The population is usually placed at 5,500,000.

Description. The surface features resemble those of the Sahara, of which it is considered an extension. It resembles the desert region of North Africa in that it contains many oases alternated by sandy and rocky wastes. Much of the interior is a vast tableland, with an altitude of about 8,000 feet, interspersed by mountains and arid deserts, and the whole surrounded by a coast plain near the adjacent waters. The northern and eastern boundaries are formed by Turkey, the Persian Gulf and the Gulf of Oman, and the southern and western by the Arabian Sea, the Gulf of Aden, and the Red Sea. On the northwest it is connected with Africa by the Isthmus of Suez. Anciently the peninsula was divided into three sections, known as Arabia Petraea, Deserta, and Felix. At present it is divided into seven districts whose boundaries are not fixed with any degree of accuracy. These include Madian, Hejaz, Assir, Yemen, Nejd, Hadramaut, and Oman. The Euphrates River drains a portion of the northern section. Besides this stream there are no important rivers and no interior lakes, and the coasts are comparatively regular. As a whole the climate is healthful. The coastal plains have a scorching summer heat, while the more elevated interior is quite pleasant at most seasons of the year, though sand storms prevail periodically. Rain seldom falls in the interior, where the climate is excessively dry, and in most parts vegetation is very scant.

INDUSTRIES. Stock raising is the chief industry, and embraces the rearing of horses, camels, sheep, cattle, and mules. The mule is used largely as a beast of burden. Mining is not carried on extensively, but it is known that there are valuable deposits of salt rock, saltpetre, petroleum, coal, mineral pitch, and various kinds of building stone. Fruits are grown extensively on the coastal plains, especially the date palm. Other products include wheat, maize, tobacco, barley, millet, aloes, balsam, and gum arabic. The ostrich is grown for its plumage. In some sections this animal is found in a wild state, especially in the oases of the desert region. Among the wild animals still abundant are the panther, hyena, lion, jackal, gazelle, and many varieties of aquatic birds and birds of song.

INHABITANTS. The inhabitants of Arabia belong to the Semitic branch of the Caucasian family, but the tribes show marked differences in descent and tribal relations. Only a portion have fixed homes, the greater number leading a nomadic life. The wandering tribes consist mostly of Bedouins, who have allotted winter and summer camping grounds, entertain notions of the right of property, possess a strong home feeling, and are governed by a traditional code of law and honor. On the other hand, the Fellahs and Hadesi constitute the located tribes. In stature they are of medium height. They are muscular and strong, and have a brown complexion. The typical Arab is sharp-witted and quick by nature. He possesses a lofty pride and is fond of poetry. Most Arabs take much interest in rearing swift horses, and look upon a fleet animal as a most valuable possession. Education is at low ebb, and is largely in the care of the wife, whose duty it is to keep the house and educate the children. Mohammedanism of the Shiite sect is the chief religion, but the Sunnites and Wahabis are represented to some extent.

GOVERNMENT. The government is divided among numerous independent chiefs, who bear the title of sheik, emir, or imam. The Sinai Peninsula is a dependency of Egypt; and Yeman, Hedjaz, Nejd, Koweit, and Transjordania are semi-independent regions. Oman, in the southeastern part, is administered by an independent imam. A number of the chief cities are held by European powers, including Aden, which is a strongly fortified garrison on the Gulf of Aden and belongs to Great Britain. Other cities include Bagdad, Mecca, Medina, Mocha, Sana, Muscat, Basara, and Hodeida.

HISTORY. The history of the Arabs before the time of Mohammed is obscure, but under the teachings of that prophet, about 600 A. D., the different tribes became united and powerful. When his doctrines secured a strong foothold and Mecca was conquered, he brought nearly the whole peninsula into submission. He was succeeded in turn by Abu-Bekr, Omar, Othman, and Ali, who assumed the title of caliph, but the period was marked by struggles for supremacy among different tribal interests. Walid I., a sovereign of this line, abolished the Greek language and written characters and substituted the Arabic. Subsequently the capital was transferred from Cufah to Bagdad, where the Arab rulers held sway over a large part of the Mohammedan world from the 8th to the 13th century. At that time they possessed great military strength, conquered Northern Africa and Western Asia, and founded a kingdom in Spain. In the East they were generally known as Saracens, and in the West as Moors. They constructed fortifications, temples, and public highways, traces of which remain in the East and in Spain, especially in the latter country, where the Moorish temples are still sources of wonder. The British occupied Aden in 1839, and the following year most of Arabia became subject to Turkey.

LANGUAGE. The Arabic language is classed with the southern branch of the Semitic family of tongues, and next to the Hebrew ranks as the most important. It was generally spoken in Southwestern Asia, Northern Africa, Sicily, Malta, and a part of Spain at the time the religion of Islam spread over those regions, and is still used as the learned and sacred language of the Mohammedans. About one-third of the Turkish and Persian vocabularies consists of Arabic words. The alphabet consists of twenty-eight characters, but eleven of these are distinguished by placing diacritical points above or beneath, hence only seventeen distinct characters are used. The writing is from right to left. As a whole, the vocabulary is extensive and the grammatical forms are complicated.

LITERATURE. The literature had its beginning in the time of the Queen of Sheba, who is the accredited author of several enigmas and poems. However, the rise of Arabic literature dates largely from the time of Mohammed, who gave it new direction and life. Abu-Bekr collected the precepts of faith and life laid down by the prophet, and these collections were afterward published by Othman, the third caliph, and constitute the Koran, the sacred book of the Mohammedans. The period in which literature, art, and science reached its zenith was in the time of the caliphs who ruled in 750-1258 A. D. Harun al Rashid (786-808) was a patron of learning, and by his interest and ability gave impulse to Arabic literature in his own country and many regions under Saracen and Moorish dominion.

The Moors in Spain wrote treatises of value on medicine, history, mathematics, geography, geometry, astronomy, and civics. Their writers in geography were the most noted of those who flourished in the Middle Ages, and their historians and philosophers also took high rank. Their philosophy was largely of Greek origin, chiefly after the teachings of Aristotle, and their most celebrated philosopher was Alfarabi, who flourished in the 10th century. Other philosophical writers included Ibn Sina, Alghazzali, and Ibn Roshd, who flourished in the 11th and 12th centuries. The Arabs excelled all other nations in medicine during the Middle Ages, the medical work of Avicenna, entitled "Canon of Medicine," being long an authoritative guide.

In mathematics and astronomy the Arabs patterned after the Greek writers, but they simplified and enlarged both sciences considerably. Algebra was introduced directly by them to the people of Europe. Their romances and legends are enriched by such familiar works as "The Exploits of Antar," "The Arabian Nights' Entertainments," "The Exploits of Bibars," and "The Exploits of the Champions." From these many European writers have drawn inspiration, and some of the tales drawn from "The Arabian Nights' Entertainments" are familiar to school children in America and Europe. The Arabians were devoted especially to astronomy, which they cultivated in observatories at Bagdad, Cordova, and other cities. Their chief textbooks in this branch of learning consisted of the "Almagest" of Ptolemy, which they translated into the Arabic. The literature of modern times is somewhat limited in scope, but they have several recent treatises on grammar, jurisprudence, and the Koran, and a number of newspapers and other periodicals are published. The Arabian writing, like all in the Semitic, is written from right to left, and is essentially consonantal.

ARABIAN NIGHTS' ENTERTAINMENTS (a-rā'bĭ-an), a collection of Oriental tales first made known to Europeans by Antony Galland, a Frenchman, who published them in 1704-17. The origin of the work is still in doubt, and it is not known by whom or where it was written, but it is supposed to have been secured by the Arabs from India, and by the Hindus from Persia. The story assigned as the origin of these fables is both interesting and remarkable. It is said that Sultan Shahriyar had a faithless bride, which induced him to make a law that all his future wives should be executed the first morning after their marriage. This custom prevailed until Shahrazad, the generous daughter of the grand vizier, became his wife. She was so skilled in story-telling that she interested the Sultan with a tale every day, and broke off at a point which would lead to an interesting conclusion the next day. In this way the execution was deferred from day to day until the Sultan became reconciled. These stories of Shahrazad now constitute "The Arabian Nights' Entertainments," or "The One Thousand and One Nights," as they are often called.

ARABIAN SEA, a large extension of the Indian Ocean, whose northern and eastern coasts are formed by Persia, Baluchistan, and India, and its western by the Arabian peninsula. Its northwestern extension forms the Gulf of Oman, which is connected by Ormuz Strait with the Persian Gulf. On its eastern shore are the Gulfs of Cutch and Cambay.

ARABI PASHA (ä-rä'bee pä-shä'), **Ahmed,** soldier and revolutionist, born in Lower Egypt, in 1837. He descended from fellah parentage, joined the army at an early age, and in 1881 headed the popular military movement to free Egypt from the dominion of other nations. In 1882 he became chief dictator, resisting successfully the French and English forces, but was finally expelled from Alexandria. Later he was defeated at Tel-el-Kebir and taken prisoner. After a trial, he was sentenced to exile in Ceylon. In 1901 he was pardoned and permitted to return to Egypt. He died Sept. 21, 1911.

ARACHNIDA (ȧ-răk'nĭ-dȧ), a class of *arthropods,* variously limited by naturalists, but usually extended to include the mites, ticks, spiders, and scorpions. Most of the animals of this class have simple eyes, but they vary in number from two to twelve. The abdomen possesses no true legs, although these animals have four pairs of legs. Some species secrete poisons, and nearly all prey on other animals. Breathing is effected either by lungs or by means of tracheae, but some breathe by both these means. The history of the Arachnida has been traced to the Palaeozoic times.

ARAD (ŏr'ŏd), a city in Rumania, capital of the County of Arad, thirty-seven miles north of Temesvár. It is the seat of a bishopric and has a number of modern buildings, including the townhall and a Greek theological seminary. The manufactures include leather, tobacco, alcohol, and machinery. It is important as a grain and cattle market. Population, 1922, 56,260.

ARAFAT (ä-rȧ-fät'), **Mount,** a granite hill in Arabia, fifteen miles east of Mecca, elevated about two hundred feet above the plain. The summit is reached by steps cut in the rock or built of solid masonry. A great multitude of Mohammedans visit this place annually, owing to the belief that Adam and Eve met upon this hill after being expelled from Paradise. It is thought that Adam was cast upon Ceylon and

Eve on Mount Arafat, and that after wandering 120 years Adam finally joined Eve on this hill. On the summit is a chapel, in which a sermon is delivered for the benefit of the visitor, who is afterward known as a Hadji, or pilgrim.

ARAGO (är'á-gō), **Dominique François,** physicist and statesman, born at Estagel, France, Feb. 26, 1786; died in Paris, Oct. 2, 1853. He studied at the College of Perpignan and the Polytechnic School, graduating from the latter in 1805. Napoleon commissioned him in 1806 to take measurements, in company with an astronomer, for the purpose of securing a longitudinal basis for a metric system, and on his works is based the metric system now used in France. When war broke out between France and Spain, while he was making these measurements, he was arrested by the Spaniards and imprisoned as a spy. He escaped at two different times, but the ship on which he sailed was wrecked by a storm on the shores of Algeria, where he was captured and made a slave. In 1809 he was set free and returned to Paris, where he was at once elected a member of the institute. Later he became a professor at the Polytechnic School, and in 1830 was made secretary of the Academy of Science. His valuable services to sciences caused the London Royal Society to award him the Copley medal. He was invited by Napoleon to accompany him to the Island of Saint Helena, which he refused to do in order that he might support the Revolution of 1830. After the establishment of the Republic, he became a member of the chamber of deputies, and won distinction as an advocate of education and advancement in the sciences. He opposed Louis Philippe in 1848, and contended against the election of Louis Napoleon to the presidency. Arago is the author of a number of works on sciences, and wrote numerous political and biographical memoirs.

ARAGON (ăr'á-gŏn), formerly a kingdom of Europe, but now a government in the northeastern part of Spain. It was united with Spain on the marriage of Ferdinand and Isabella, in 1469, but a complete union did not take place until ten years later. It is divided into the provinces of Huesca, Teruel, and Sargossa. The area is 14,984 square miles. Sargossa is the capital. In 1922 the province had a population of 975,580.

ARAGUAY (ä-rä-gwī'), or **Grande,** an important river of Brazil, rises by several branches in the southern highlands of that country, and after a course of 1,350 miles joins the Tocantins River, which carries its water into the Para estuary. It incloses Santa Anna, an island 200 miles long, and is navigable for 1,000 miles. The Das Mortes is its chief tributary.

ARAL (ăr'al), an inland salt-water lake of Asia, including a surface of 26,650 square miles, and forming the outlet of the historic Oxus, or Amu River, and of the Kizil Kum. It has no outlet to the sea, but there are evidences that it was formerly connected with the Caspian Sea. The lake has valuable sturgeon and other fisheries. It is located wholly in Russian territory. At a remote period of history the lake bed was dry, and the waters of the rivers that now discharge into it flowed into the Caspian Sea.

ARAM (ā'ram), **Eugene,** author, born at Ramsgill, England, in 1704; executed Aug. 6, 1759. He descended from a gardener in humble circumstances, received only a limited early education, but later acquired a knowledge of Latin and Greek. His reputation is based on excellent success in school teaching and profound ability as a writer. In 1745 a man named Daniel Clark disappeared, and Aram was accused of having killed him. Being thought implicated on account of circumstantial evidence, he was arrested and convicted, and subsequently was hanged. The story of Eugene Aram is told in a ballad by Hood, entitled "The Dream of Eugene Aram, the Murderer," and in a romance by Bulwer Lytton, entitled "Eugene Aram."

ARAMAIC (ăr-á-mā'ĭc), a language spoken in the country between the Mediterranean Sea and the boundaries of Persia and Media on the one side and Asia Minor on the other. This section of Asia contained Mesopotamia, Chaldaea, and Assyria, and in ancient Hebrew histories the language is assigned to what is now known as Syria. There were two dialects, known as East Aramaic or Chaldee and West Aramaic or Syrian. The books of Ezra and Daniel and the Babylonian Talmud were written in Aramaic, and it was the official language in Palestine until Hebrew supplanted it.

ARAPAHOES (a-răp'a-hōs), an Indian tribe of North America, formerly resident near the sources of the Arkansas and Platte rivers. Their survivors were transported to reservations now included in Oklahoma, where they were allotted land, and became prosperous as farmers and stock raisers. This tribe of Indians was generally friendly to the whites.

ARARAT (ăr'a-răt), a mountain of Western Asia, in Armenia, on the boundary between Persia, Turkey, and the Russian possessions. Its summit is covered perpetually with snow and rises 17,325 feet above sea level. Vegetation extends to the snow line, about 14,000 feet. It is volcanic, but is now thought to be extinct, the last eruption taking place in 1840. This mountain is historic on account of being the landing place of Noah's ark after the deluge, an account of which is contained in the Bible, in Gen. viii., 4.

ARAUCANIA (ä-rou-kä'nē-á), a district in the southern part of Chile, inhabited by the Araucanians, a native race of South America. The district includes the larger part of the province of Arauco and its boundaries are not well defined. The inhabitants were the last native tribe to become subject to the Spaniards.

From 1537 to 1773 they maintained their independence by force of arms, but in the latter year Spain recognized them as an independent people, and they did not submit until 1872, when their territory was made a part of Chile.

ARAUCARIA (är-ạ-kā′rĭ-ȧ), a genus of large cone-bearing trees of the pine family, native to Australia, South America, and the islands of the Pacific. The branches spread greatly and are covered with flat sharp-pointed leaves. Several species furnish timber of value for building, especially the Chile pine of the Andes and the Moreton Bay pine of New South Wales.

ARBELA (ärbe′lȧ), an ancient town of Assyria, in the province of Bagdad, now the Turkish town of Erbil or Arbil. The modern town is built mostly with sun-dried brick, but has a number of large mosques and bazaars. It is famous on account of the last of the great battles fought between Alexander and Darius, in 331 B. C., though the battle took place at Gaugamela, about twenty miles distant. The present population is about 6,000, mostly Kurds.

ARBITRATION (är-bĭ-trā′shŭn), the settlement of disputes by submitting them to the decision of a private person or persons, instead of litigating in a court of justice. It is not permitted to arbitrate criminal cases, and adjustments and settlements in civil cases by this means are not necessarily binding upon the parties thereto, even though an agreement to arbitrate be made in writing, since the contracting parties would in that case have no recourse to the jurisdiction of the courts.

It has been a direct object of trades unions to avoid strikes and lockouts through the medium of arbitration. A number of governments have laws authorizing arbitration, and in sixteen states of the United States boards of arbitration are specially provided by law. In some of the states the decision of a board of arbitration is binding on both parties for six months, or either party may give sixty days' notice to have the decision set aside, while in the other states proceedings of this kind may be enforced by judgment, or the party objecting may be punished for contempt. New Zealand has a compulsory arbitration law, which was brought about to set aside the injurious effect of strikes. It is claimed that the law has not closed a factory, that strikes and lockouts have been few, and that wages and conditions under which workingmen have labored have been vastly improved. There men working on a salary as well as wage-earners may take advantage of arbitration. The last decade is notable for the growing tendency among legislators and the people to favor the principles of arbitration and gradually extend its benefits in personal cases as well as those affecting railways and other common carriers.

International arbitration refers to the settlement of disputes between states by judges chosen under an agreement, and the tribunals so constituted are governed by articles specifying the matters to be considered. In practice the judges or conference are special or general and are more or less restricted by agreement, and the relief granted may be temporary or permanent. Czar Nicholas II. recommended a peace conference, which met at The Hague, July 29, 1899, for the avowed purpose of effecting an understanding whereby a large part of the standing army might be disarmed and the general peace of nations preserved. While the object sought has not been attained, it has caused thought to turn toward means whereby prolonged wars may be avoided through peaceful means, and as a result several questions of international importance have been referred to arbitrators. The most important instance of this kind in 1905 was the arbitration of the case between Russia and Great Britain on account of Admiral Rojestvensky firing upon English fishermen in the North Sea. The result of this adjustment was that Great Britain was awarded damages amounting to $325,000, which sum was paid, and further difficulties were avoided.

Important among the list of arbitrations in which the United States was a party are the following:

I. Settlement of the northeastern boundary, under the Jay Treaty of 1794, in which the United States and Great Britain were interested.

II. The Treaty of Ghent in 1814, between the United States and Great Britain, which provided for determining the northeast boundary of the United States from the Saint Lawrence to the Saint Croix River, ownership of certain islands in the Bay of Fundy and the Passamaquoddy Bay, and to fix the boundary between the United States and Canada along the middle of the Great Lakes and to the Lake of the Woods.

III. Arbitration between the United States and Great Britain in 1818, relative to the ownership of slaves who had been taken possession of by the British, with the result that the United States accepted $1,240,960 in full settlement.

IV. An adjustment between the United States and Spain in 1819, which had reference to the claims of the Americans against Spain that arose during the occupation of Florida by the latter country.

V. Adjustment of disputes regarding the northeastern boundary, in 1827, in which the case between the United States and Great Britain was referred to the King of the Netherlands, and subsequently the matter was compromised in the Webster-Ashburton Treaty.

VI. Settlement between the United States and France of claims on account of damage done at sea by the French in the wars of Napoleon.

It was adjusted in 1831 by awarding $5,558,108 indemnity to the United States. The claims were paid five years later, Great Britain acting as mediator.

VII. Settlement of the northwestern boundary, between the United States and Great Britain, in 1846, having reference to the San Juan de Fuca Straits and the Haro Canal.

VIII. Adjustment of fisheries rights, in 1855, along the shore of Canada, which was formally adjusted in 1866.

IX. Settlement of disputes between the United States and Venezuela, in 1866, on account of claims of American citizens against the latter country. An adjustment was reached under which more than a million dollars was to be paid, but a second commission reduced the award to $980,750, which was paid to the United States.

X. Arbitration between the United States and France on account of injury growing out of the Mexican War of 1862-67, the Civil War, and the war between France and Germany, in which $612,000 was awarded to France.

XI. Arbitration of rights in Samoa affecting the United States, Germany, and Great Britain, in 1889, which was submitted to the King of Sweden and an agreement was signed at Washington in 1899.

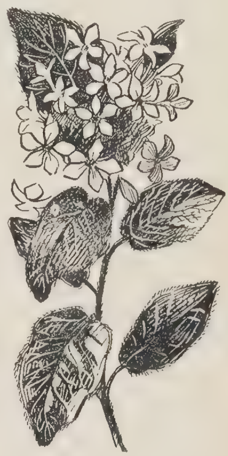
XII. Arbitration of the United States and Great Britain, in 1892, regarding fisheries of the Bering Sea, in which an agreement was reached in 1896, and the United States paid $471,151 to Canadian sealers.

XIII. Settlement of the boundary between Alaska and the British possessions, in 1897, which resulted in a final agreement in 1899.

ARBOR DAY (är'bẽr), a day designated by legislative enactment for the planting of trees, and which has come to be a day regularly observed in many states of the United States by the pupils of the public schools. Most states of the central west publish annually a manual compiled by the State department of public instruction. This is sent to all the schools, and serves as a guide and program in conducting appropriate exercises. In some localities Bird Day is now associated with Arbor Day, the purpose being to stimulate interest in the study and protection of birds. The day came to be observed largely by the need of planting trees in the states of the Mississippi Valley. It was first inaugurated in Nebraska in 1874 by the State Board of Agriculture, at the suggestion of J. Sterling Morton, who afterward served as Secretary of Agriculture during President Cleveland's second administration. Besides planting trees for shade and ornamental purposes, it is customary to plant them in memory of authors, statesmen, and war heroes. The day is looked forward to with as much pleasure as Washington's Birthday or Thanksgiving Day, and is quite as appropriate. All other great days celebrate the past, but this day speaks for the future.

ARBOR VITAE (är'bẽr vī'tē), a class of plants and shrubs allied to the cypress. They are evergreen, have flattened or compressed branchlets, and give off a pleasant balsamic smell. The arbor vitae common to North America is prolific and grows to a height of forty to fifty feet. Chinese arbor vitae is a species valuable for its resin, which yields a medicine useful in rheumatism.

ARBUTUS (är'bů-tŭs), a genus of trees and shrubs belonging to the heath order. The *strawberry tree*, which is a species of arbutus, yields a fleshy fruit useful for food and in the manufacture of beverages, especially alcoholic spirits. It is native to large parts of Southern Europe, and has been introduced to North America, especially California. The *trailing arbutus*, or mayflower, is an American species of this genus of plants. The leaves are opposite in most species, and the foliage is quite beautiful.



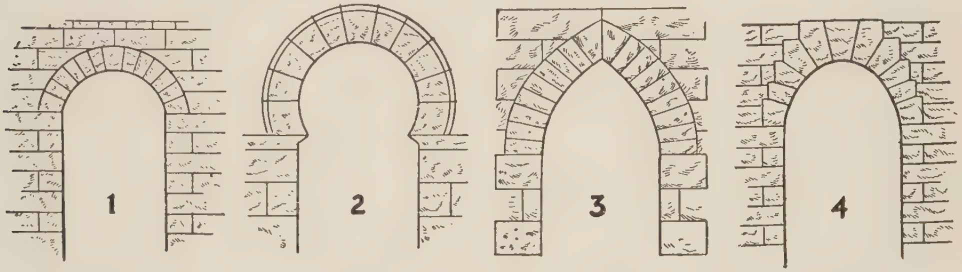
ARBUTUS.

ARCADE (är-kād'), in architecture, a covered passage, either open at the side with a range of pillars, or completely covered with woodwork or masonry. The term is applied in Gothic architecture to a range of arches, supported on columns or tiers, either open or attached to a wall. In many structures of the mediaeval period they form the principal decorations both on the inside and outside, sometimes as real, and other times as blind, galleries. At present the finest arcades are in Paris, where they are convenient thoroughfares as well as decorations, and many are lined with elegant shops.

ARCADIA (är-kā'dĭ-ȧ), an inland and mountainous country of ancient Greece, next to Laconia the largest ancient division of the Peloponnesus. The most important mountain is Cyllene, the birthplace of Hermes. In the eastern portion are several lakes, whose waters form the great waterfall of the Styx, which was thought by the Greeks to be the principal river of the infernal regions. The inhabitants from times far remote possessed marks of simplicity and inertness, due largely to the condition of their rural life and their employment, which was principally pastoral. They conducted a number of wars against the Spartans and later joined the Achaean league, and still later their territory was merged into the Roman province of Achaia. At present Arcadia forms a province of the kingdom of Greece. The area is 2,030 square miles and its population, 147,650.

ARC DE TRIOMPHE DE L' ETOILE (ärk de trê-ônf' de lȧ-twäl'), a triumphal arch located in Paris, at the head of Champs Elysées. It was begun by Napoleon I. in 1806 and completed 30 years later by Louis Philippe. The structure was designed by Chalgrin, is 150 feet long by 160 feet high, and is ornamented with reliefs representing the victories of Napoleon. It is the largest structure of the kind in the world.

ARCH (ärch), in building, a portion of masonry in the shape of an arc or bow, constructed in the form of truncated wedges, and arranged in a curved line in order to support weight by mutual pressure. It is usually constructed to support the building over an open space, as a doorway, in which a single stone often forms the entire arch. When constructed of a number of stones, it contains a middle wedge-shaped stone, called the *keystone,* its purpose being to lock the whole together. The exterior or upper curve is the *extrados;* the inner curve, the *intrados;* the highest part, the *crown;* and the lowest stone on either side, the *springer.* In constructing an arch a temporary frame of wood is first put up, the top of which is shaped like the arch; then the stones are laid up to it until they connect at the top, and the keystone is put in, when the temporary structure is taken down. In Moorish architecture the arch is in the form of a horseshoe, while the Gothic is pointed at the top. The longest stone arch ever made is in the bridge over the Adda River, in Italy. It is 251 feet long and was completed in the 14th century.



1, Semi-circular. 2, Moorish. 3, Gothic. 4, Elliptical.

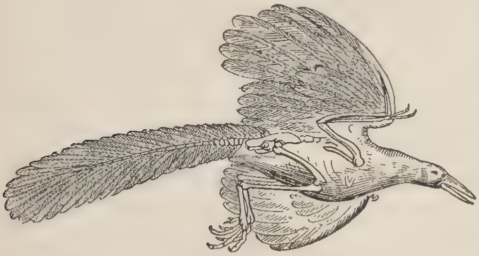
ARCHES.

ARCHAEAN (är-kē'ăn), the earliest period in geological history, extending up to the Lower Silurian. It includes two ages, the Azoic and Eozoic, the former embracing the time previous to the appearance of life, and the latter including the earliest forms of life. American writers frequently refer to the Archaean period or system as the Primitive, Laurentian, and Huronian. The rocks of this period consist largely of granite, gneiss, and schist, mixed more or less with igneous formations, and they are characterized by volcanic disturbances in periods far remote. In America this system abounds in British America from the Arctic to the Great Lakes, and in extensive regions of the Appalachian and Rocky Mountains. It abounds in Eastern Asia, Central Africa, and Northern Europe, extending in the last-mentioned continent from the Arctic Ocean through the Scandinavian Peninsula to the Alps.

ARCHAEOLOGY (är-kė-ŏl'ȯ-jy̆), the name given to the study formerly known as that of antiquities. In its wider sense it includes a knowledge of the origin of the language, law, religion, institutions, literature, manners, arts, science, customs, in fact everything that can be learned of the habits and life of a people. In a narrower signification it is understood to mean and include all the material from which a knowledge of the ancient conditions are to be attained, but usually comprehends more or less of several branches of knowledge that are recognized as distinct lines of study. Archaeology divides the primitive stages of human life and occupation into various periods, such as the stone, bronze, and iron ages. These names are used to designate periods of time on account of the materials employed during the different ages for implements and weapons. The word *age* designates the stage at which a people arrived, hence *stone age* means the period of time before the use of bronze, and the phrase *bronze age,* the time before iron was employed by any particular people. These ages are again divided and subdivided until all times, conditions, and phases of human life become classified for convenience in study. In the 19th century more was learned of the antiquity of man than in all previous centuries.

ARCHAEOPTERYX (är-kė-ŏp'tė-rĭks), a fossil bird of which traces are found in the rocks of the Jurassic system. Fossil remains are more numerous in Bavaria than in any other region. This animal was about the size of a crow and had thirteen teeth in the upper mandible and six in the lower, each tooth set in a separate socket. The tail was long and the wings were large, and that it was able to fly is not doubted, since its feet indicate that it had arboreal habits. Some naturalists have traced through this animal a possible relationship between the birds and the reptiles. See illustration on following page.

ARCHANGEL (ärk-ān'jĕl), or **Arkhangelsk,** a city in Russia, capital of a province of the same name, on the Dwina River, 740 miles northeast of Petrograd. It has good railroad and steamboat facilities, and an extensive trade with Russian and other port cities by the White Sea. Being in a cold region, the port is closed for six months by ice. It was founded in 1584, and was long the only seaport of Russia. The shortest day at Archangel is about three hours, while the longest is twenty-one hours. Archangel province has an area of 331,490 square miles and a population of 356,675. The population of the city is 38,648.



ARCHAEOPTERYX.

ARCHANGEL, a term used to denote an angel superior in power and glory to other angels, but some think it has direct reference to Christ. In I. Thess. iv, 16, is given an account of the coming of the Lord on the last day, which is to be: "With the voice of the archangel, and with the trump of God."—Archbishop, a chief bishop, or one who superintends the conduct of other bishops. This position was established in the early period of Christianity, and is continued by the Roman and Greek Catholic and several Protestant churches.

ARCHBALD (ärch'bald), a borough of Pennsylvania, in Lackawanna County, 10 miles northeast of Scranton, on the Lackawanna River. It is conveniently located on the Delaware and Hudson and the New York, Ontario and Western railroads. Coal mining is carried on extensively in the surrounding country. Silk textiles, clothing, and machinery are manufactured. Population, 1920, 8,603.

ARCHELAUS (är-kê-lā'ŭs), eminent Greek general, a native of Cappadocia, and associated with Mithridates the Great. In 87 B. C. he sought to expel an invasion of Greece by the Romans, but was compelled to retreat to Athens, where he was attacked and besieged by Sulla, who defeated him at Chaeronea and Orchomenus. He deserted and joined the Romans in 81 B. C., after signing a treaty of peace with Sulla, and commanded a Roman army in the second Mithridatic war.

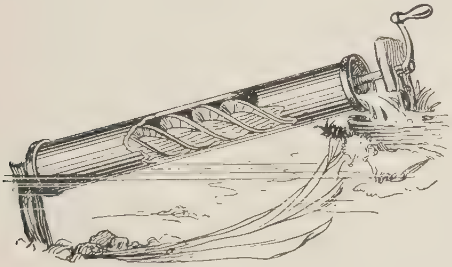
ARCHER FISH (ärch'ẽr), a small fish common to the East Indies. A species native of Java is about six inches long, has an elongated lower jaw, and its body is covered with small scales extending to the lower part of the dorsal fins. This fish is remarkable for the manner in which it ejects drops of water at insects, causing them to fall from the air into the water, where they are caught and devoured. The projectile force with which water is thrown is so forceful that it will strike a fly at a distance of three to four feet.

ARCHERY (ärch'ẽr-ȳ), the art or practice of shooting with the bow and arrow. The use of this weapon in war and for hunting dates from early antiquity. The ancients most skilled in archery were the Cretans, Thracians, Numidians, and Parthians, and in later years the Arabs, Saracens, and Germans. Long after the discovery of gunpowder we find the bow and arrow still used, even as late as 1572, when Queen Elizabeth promised to place at the disposal of Charles IX. 3,000 archers. In the 18th century societies were formed in England to preserve archery for the purpose of enjoyment and healthful exercise, and it is still popular as a recreation in the United States and Europe. The American Indians, at the time of the discovery of America, used the bow and arrow exclusively for defensive and offensive warfare, and they still practice the art for amusement.

In recent years archery, as a recreation and healthful exercise, has grown in popularity, and clubs to promote the amusement are quite common in the United States and Canada. The practice is confined chiefly to shooting at targets. The Potomac Archery Association and a number of others hold annual contests, the rounds consisting of ninety-six arrows at sixty yards. It is common to have team competitions as well as tests for the longest flight, and in amateur contests the rounds usually consist of sixty arrows at forty yards.

ARCHIMEDES (är-kĭ-mē'deez), the most celebrated of ancient mathematicians, born in Syracuse, Sicily, about 287 B. C. He is reputed to have been a kinsman of King Hiero, though he took no part in public affairs, and devoted his entire time to scientific research. Considering the condition of mathematics in his time, the discoveries of utility he made, and the many useful rules he formulated, his works may be regarded both important and wonderful. On his discoveries are based modern methods of measuring curved surfaces and solids. He demonstrated that the area of a segment of a parabola is two-thirds of the inclosed parallelogram. He also made higher investigations and wrote a treatise on spirals. The principle of hydrostatics to which his name is attached is, "That a body immersed in a fluid loses as much in weight as the weight of an equal volume of fluid." It is said that this caused him so much joy that he exclaimed, *Eureka! Eureka!* meaning thereby, "I have found it! I have found it!" He was the inventor of the Archimedes screw, the compound pulley, and other useful implements. It is said that he originated an appliance by which he concentrated the rays of the sun through the agency of concave mirrors, and thereby set the Roman ships on fire in an engagement. Several of his works on mathematics are still extant. He was slain at the time of the Roman invasion, in 212 B. C., while sitting in the market place engaged in the solution of some mathematical problem.

ARCHIMEDES' SCREW, a machine for lifting water, thought to have been invented by Archimedes while in Egypt for draining and irrigating land. It is constructed of a tube fastened around a solid shaft or cylinder, and so framed that it may be turned around its axis. The cylinder is hollowed out to form a double or triple threaded screw. The machine is placed in position with one end in the water and the other resting on a perpendicular pillar. When in this position, the lower end fills with water, and, when the shaft or cylinder is turned, the revolution carries the water upward to the perpendicular post and causes it to fall at its base. Similar machines are now built and largely in use in Holland for draining the lowlands.



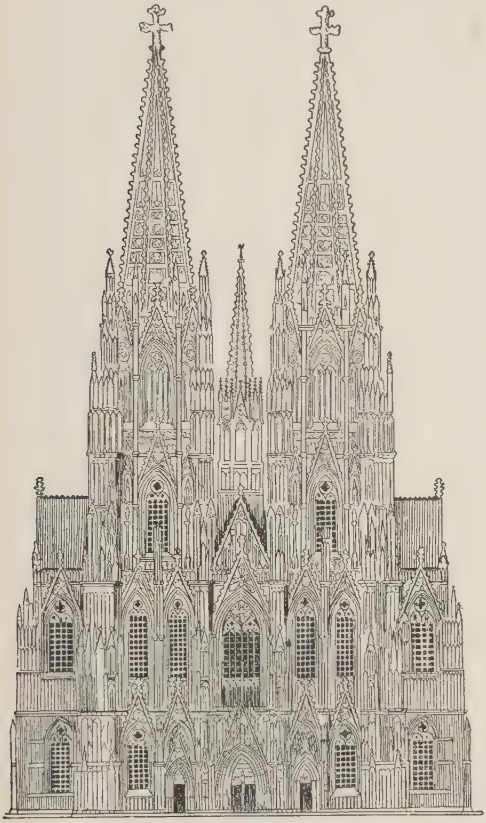
ARCHIMEDES' SCREW.

ARCHIPELAGO (är-kĭ-pĕl'á-gō), the name applied to a group of islands, such as the Caribbean, Patagonian, Aleutian, and others. However, the term was originally used to designate the archipelago located in the Mediterranean Sea, commonly called the Grecian archipelago.

ARCHITECTURE (är'kĭ-tĕk-tûr), the art of building. The term is used more specifically to denote the art of building human habitations, temples, or edifices of any kind, either humble or splendid. It is limited generally to the art of constructing edifices to gratify the mind, please the eye, and answer primary purposes of utility. It is often classed as a science, because it draws upon geometry and carries out the principles of various sciences. The architecture of a people indicates their mental and moral qualities, and is an index of the state of civilization to which they have attained. As a whole it is commonly divided into three classes: military, naval, and civil. Military architecture embraces the construction of fortifications for defensive purposes, as a means of subduing insurrections or repelling an invasion by foreign enemies. Naval architecture comprises the art of shipbuilding and includes the construction of vessels for commerce and offensive and defensive action in war. Civil architecture comprises all other lines not included in the two former, and is generally studied from an artistic, scientific, and utilitarian point of view.

Remote Ancient Architecture. Numerous styles of architecture have been known from times far remote. Their characteristics were determined largely by the social development and moral aptitude of the nations. The oldest architectural structures that still remain are those of the Egyptians. They are of immense size, simple in design, and of regular outline, and indicate that the builders took into account few rules that render a building artistic. Immense blocks of stone were raised to great heights, and used to complete plain, rough structures. Most of the larger buildings of Egypt were destroyed fully 500 years B. C. Those that do remain contain great walls and pillars ornamented with hieroglyphics and drawings on stone. They are rather inelegant, but serviceable in preserving the history of the builders. The most interesting structures that still remain are the pyramids, once the tombs of Egyptian kings, built of immense blocks of stone, and gradually narrowing from a broad base to a narrow apex. The largest still in existence is 498 feet high and 693 feet square at the base. The Grecian historian, Herodotus, in giving an account of these ancient wonders, ascribes their building to Cheops, who kept 100,000 men at work on the largest one for a period of twenty years. The obelisks were placed at the entrance of palaces and temples, and on their surface were descriptive hieroglyphics and symbols illustrating the successes achieved in war by the great kings and heroes. They were usually four-cornered shafts of immense height, cut from the quarry in single blocks, and used as ornaments in public places. Ruins of great palaces are found in Persia and Assyria, the oldest and most noted among them being the palace of Nimrod, probably built in the year 884 B. C. Others are found at Susa in Persia, and still others in Babylonia, where once reigned the great Nebuchadnezzar, a Chaldean King of Babylon, in the 6th century B. C. The brick found in these ruins bear the imprint of this famous sovereign of ancient history, and indicate that the architecture of his time was wonderful in its massive design and durable strength.

Greek Architecture. In Grecian architecture three styles are recognized, the Doric, the Ionic, and the Corinthian; the important differences in these styles consist rather in the finishing than in other respects. The most beautiful Grecian structures were erected in the period included between 650 and 324 B. C. In general, the Greek buildings were adorned with paintings and sculptures, and the details were enriched by magnificent colors. The most remarkable edifices of the Greeks were temples dedicated to the cause of patriotism, of which class the Parthenon at Athens, which still remains, is the most famous. They built large theaters capable of seating 20,000 spectators and provided them with general conveniences for the assemblage of large numbers. Ruins of many Grecian structures are still found in Sicily, Greece, and Asia Minor. With the death of Alexander the Great, Grecian architecture rapidly declined.



COLOGNE CATHEDRAL, GERMANY.

Roman Architecture. The Romans patterned largely from the Greeks, and built after their style in the construction of theaters, temples, bridges, aqueducts, baths, triumphal arches, and private residences. Their orders included also the Tuscan and Composite styles. The Titus arch at Rome is one of their finest structures. In the reign of Augustus the architecture of Rome attained its greatest perfection, which is evidenced by the fact that many magnificent edifices of his period are still intact. In the construction of aqueducts and sewers. the Romans were especially skillful, in which they made extensive use of the arch. They built vast baths, or thermae, suitable for use by a multitude of people at the same time. Their architecture was not only utilitarian, but combined with that essential feature an imposing and costly appearance. Roman architecture began to decline soon after the death of Hadrian, in 138 A. D.

Byzantine Architecture. At the time of Constantine the Christians were permitted to build places of worship. Their architecture still marks by its peculiarities many of the churches of Eastern Europe and Asia Minor. The style of architecture adopted by these Christians is known as the Byzantine, from Byzantium, once the capital of Rome. Saint Sophia, at Constantinople, is one of the finest churches built in this style, but it has been converted into a Turkish mosque. It was constructed by Justinian, and to it were applied the fundamental principles of the Roman arch. Its magnificent dome is the most striking feature of the building. With the fall of Rome the most beautiful and valuable works of ancient architecture were destroyed by the Vandals, Goths, and other barbarians of Europe and Western Asia. Soon after other styles of architecture were introduced by the Normans and Lombards. The former flourished in England in the 13th century, while the latter originated in South Germany as early as the 8th century. With the conquest of Spain by the Moors in the 8th century, Moorish or Saracenic forms of architecture were introduced into Europe. The most noted Moorish building still remaining is the Alhambra, near the city of Granada, Spain. The early Germans were unskilled in architecture and did not make any progress in this line until the 8th century, when Charlemagne introduced the Roman and Byzantine styles. Later Romanesque architecture, in which the semicircular arch is prominent, became popular both in France and Germany.

Gothic Architecture. Later the people of Germany and France began to develop the modern Gothic style, with its pointed arches, clustered pillars, vaulted roof, and profusion of ornaments. The best forms of architecture in England and Scotland are built after the styles introduced by the Normans, after their conquest of Britain. The finest specimen of Gothic architecture in Europe is the Cathedral of Cologne, Germany, and the best representative of this style in England is Westminster Abbey, London. At a later date the windows were divided into small panes, the doorways were constructed with square tops over pointed arches, and other departures from former styles were made, as, for instance, by tracery in straight lines instead of waving lines. In the 17th century England adopted largely what was known as the Elizabethan style, divers characteristics of which are still found in many buildings in that country. The Gothic style was superseded in Italy by the Renaissance style, which was in fact a revival of the classic style and aimed rather to make ornamental than useful.

Recent Architecture. Modern architecture is a term used to designate all varieties of styles in building since the Renaissance. Though not always, it is quite generally in imitation of older forms. Private dwellings are of the Renaissance style, while churches are constructed more or less after the Gothic. However, modern architecture employs different materials more largely than were employed in former times, especially iron and steel. Besides, in cities many buildings are of considerable height, largely on account of the enormous rise of values in real estate in the business centers and advantages gained by location in close proximity to the great avenues of business. However, a building with twenty to fifty stories is no disadvantage so far as convenience is concerned, for the reason that the general use of elevators has made access to the upper stories a matter of only a few moments. In some of the great cities of the United States and Canada structures have been erected in which more business is transacted in a year, and in many more lines, than in whole cities containing a population of 10,000 people. Such vast buildings are used for department stores and the jobbing trade, and in many cases for a large combination of interests.

The buildings of large cities have increased in height the past quarter of a century. At present there is no disposition to cease erecting tall buildings in the congested centers of large municipalities. Eiffel Tower at Paris, France, which is not a building, has a height of 984 feet and is the tallest structure in the world. The Woolworth building of New York, height 792 feet, is the tallest building in the world. Other well-known structures include the Washington Monument, 555 feet high; the Cologne Cathedral, Germany, 512 feet; the Statue of Liberty, New York, 305 feet; and the projected Book building, Detroit, 873 feet. The projected Larkin tower, New York, when completed, will have a height of 1,208 feet.

It is estimated that it would be possible to safely construct and maintain a building 2,000 feet high, subject to the limitation of fifteen tons to the square foot, on a plot 200 feet square. This is according to a public statement of O. F. Semsch, designer of the steel work of the Singer tower in New York.

The use of steel has made the larger lofty buildings of the present time possible. However, some tall buildings constructed of masonry are well-known. These include the Pharos Lighthouse at the entrance of Alexandria, Egypt, which was built by the Romans when they occupied Egypt. It was a massive building 500 feet high, constructed entirely of masonry. The cathedral buildings of the middle ages are numerous in Europe, of which the Ulm Cathedral is the highest, being 525 feet.

The proposed Larkin tower, with a height of 1,208 feet, will have two stories below the sidewalk and one hundred eight stories above the street. It will not only be the highest office building in the world, but will be one of the most substantial and best constructed buildings.

Modern architecture is so diversified and partakes of such a large variety of form that it has become difficult to classify all the different styles. The most modern structures erected in large cities, and which are designed for much capacity on a small foundation, contain a framework entirely of steel. In these buildings the steel frame carries the whole building. Among the advantages accruing from such architectural styles are rapidity in construction, large capacity, great durability, and entire safety from fire. Some of the most wonderful and finest buildings of recent design are the Stevens Hotel, Chicago; the Railway Exchange Building, St. Louis; and the Singer building and the Woolworth Building, New York City. The last mentioned is 51 stories high. Other buildings quite as substantial and serviceable have been constructed in many of the large cities of Canada and the United States. A personal inspection of any of these will inspire feelings of awe and admiration. What a wonderful transition from the Indian hut of primeval America to the colossal structures witnessed in the 20th century!

ARCH TRIUMPHAL, a decorated arch built by the Romans to celebrate a victory, and through which a victorious general and his army passed in triumph. This custom grew and caused permanent structures, richly sculptured in bronze and stone, to be built after the pattern of a city gate. Among the most remarkable of these arches still remaining in good condition are the arch of Trajan at Beneventum, the arches of Titus and Constantine at Rome, and that of Augustus at Armini. See **Arc de Triompe de l' Etoile.**

ARC LIGHT, a kind of electric light produced by current of high electro-motive force passing between a pair of carbon rods, kept a short distance apart, one being in contact with the positive and the other with the negative terminal of a dynamo. It is unsteady because the arc leaps from side to side as the carbon wears away, the carbon rods being kept at the proper distance by an automatic regulator. The arc light is the most brilliant artificial light known, and is used for lighting halls, streets, and other public places.

ARCOLE (är'kô-lå), a village in Italy, on the Alpone River, a tributary of the Adige, 15 miles southeast of Verona. It is celebrated for a decisive battle between the French under Napoleon and the Austrians under Aldinczy, on Nov. 17, 1796, in which the Austrians were defeated. The battle commenced on the 14th of November, and in the series of engagements the Austrians lost 18,000 men and were com-

MODERN AND PRIMITIVE BUILDINGS.

Upper View—Modern home. Notice the lawn and cement walk
Central View—Rude primitive dwellings in the lake.
Lower View—Dwellings built of bamboo, mud and grass.

pelled to abandon the relief of Mantua, which was besieged by a French army. At present the population of Arcole is 5,259.

ARCOS DE LA FRONTERA (är'kôs dȧ lä frôn-tā'rȧ), a town of Spain, in the province of Cadiz, on the Gaudalete River, about 30 miles northeast of Cadiz. It is the seat of seven monasteries, a Gothic church, and a public library. Considerable trade is carried on in wine, fruit, and tanned leather. Magelhaens started from this place in 1569 on his first trip to circumnavigate the globe. Population, 1920, 14,393.

ARCTIC (ärk'tĭk), the term which implies the opposite to Antarctic and has reference to the region surrounding the North Pole. The North Pole was so named from its proximity to the constellation of the bear, called *Arktos* by the Greeks.—Arctic Circle, a circle imagined drawn parallel to the Equator, at a distance of 23° 28′ from the North Pole. It includes the North Frigid Zone, and is of equal extent to the South Frigid Zone, which surrounds the South Pole. These are called the two polar circles. Within each of these circles occurs a period of the year when the sun does not set, and another when it is not seen. Each of these periods is longest at the poles, at which the days and nights are of six months' duration.

ARCTIC EXPEDITIONS, the designation applied to the expeditions designed to penetrate and explore the vast regions surrounding the North Pole. Formerly the prime object of Arctic explorations was to seek and establish a passage by way of the polar regions to Asia, but it was also thought for many years, and this view is still held by some, that an open sea lies near the North Pole. To explore this supposed open expanse and establish a passage by it were undoubtedly the objects that first led to these expeditions. When it became known that passage through these regions is impossible, expeditions were still sent for the purpose of scientific discovery, and to experiment in endeavoring to get to or nearest to the pole. Up to 1906 the farthest point north was reached by the Duke of Abruzzi, but he was exceeded by Peary in 1907, by Cook in 1908, again by Peary in 1909, and by Umberto Nobile in 1928. The following are among the points farthest north reached by famous explorers, including those of Peary and Cook, both these explorers sailing from the United States:

YEAR.	EXPLORERS.	N. LATITUDE.
1607	Hudson	80° 23′ 0″
1773	Phipps	80° 48′ 0″
1806	Scoresby	81° 12′ 42″
1827	Parry	82° 50′ 0″
1874	Meyer (on land)	82° 0′ 0″
1875	Markham and Parr (Nares' expedition)	83° 20′ 26″
1876	Payer	83° 07′ 0″
1884	Lockwood (Greely's party)	83° 24′ 0″
1896	Frithjof Nansen	86° 14′ 0″
1900	Duke of Abruzzi	86° 33′ 0″
1906	Robert E. Peary	87° 6′ 0″
1908	Frederick A. Cook	0° 0′ 0″
1909	Robert E. Peary	0° 0′ 0″
1928	Umberto Nobile	0° 0′ 0″

See **Polar Expeditions.**

ARCTIC OCEAN, the ocean which surrounds the North Pole. It is bounded on the south mainly by the grand divisions of North America, Europe, and Asia, and is wholly included within the Arctic Circle. A wide expanse of the sea between Norway and Greenland connects it with the Atlantic, and it communicates with the Pacific by the narrow channel of Bering Strait. Within it are numerous islands, including Nova Zembla, Spitzbergen, Franz Josef Land, New Siberia, and the Arctic Archipelago of North America. Among the principal rivers that flow into it are the Mackenzie, Lena, Obi, and Yenisei. The Arctic Current flows southward between Iceland and Greenland, doubles Cape Farewell, and passes into Davis Strait, where it is joined by the Labrador Current. A small drift of water passes into the Arctic through Bering Strait.

A large part of the Arctic Ocean is frozen during the greater part of the year. Owing to dense fogs, floating icebergs, severe storms, and long nights, only a comparatively small part is accessible to navigators. However, it is a prolific source of whales, and many ships visit the southern portions annually. The most valuable regions for fishing are west of Spitzbergen, in the vicinity of Greenland, and in the waters contiguous to Alaska. The region of Bering Strait yields annually large quantities of whales, cod, and walrus. On the eastern coast of Siberia are found numerous bones of mammoths. These bones are inclosed in ice, and are released at the time of the thaws in the summer season. Besides fossil remains of ivory, there are large beds of wood, some of it petrified, and some in an advanced state of decay. Some of these wood deposits are forty feet below the surface, and indicate that in prehistoric times luxuriant vegetation existed in the far north, both in Eurasia and North America. Sea water freezes at about 28°, and the ice reaches a thickness of about seven feet in one season, from which the intense cold of the polar regions may be understood.

The icebergs met with in the Arctic Ocean reach an enormous thickness, being an accumulation of snow and ice that is piled up for many years. The presence of these obstructions endangers navigation and makes it necessary that exploring expeditions proceed with great caution. While a region of about 2,500,000 square miles surrounding the North Pole is unknown to geographers, it is reasonably certain that the unknown part is a vast sea of ice. The northern lights, known as the aurora borealis, are beautiful illuminations of the Arctic seas, and extend far into the heavens, hence they may be seen a long distance toward the south from the north polar regions. They appear in a variety of forms. At times great pillars of light move rapidly across the heavens, or the entire northern sky is lit up by one great flash of rapidly moving beams. The illuminations more frequently observed consist of arches of fire, from which long streamers flash toward the zenith.

ARCTURUS (ärk-tū'rŭs), a fixed star, the largest in the constellation of Boötes. It is a star of the first magnitude, in the northern heavens, and may be found by continuing the curve of the tail of the Great Bear.

ARDMORE (ärd'môr), a city of Oklahoma, in the Chickasaw nation, about ninety miles southeast of Oklahoma City, on the Atchison, Topeka and Santa Fé and other railroads. It is surrounded by a fertile farming region, and has a considerable trade in farm produce, live stock, and merchandise. Bituminous coal is mined in the vicinity. Among the public improvements are several fine school and church buildings, waterworks, and electric lights. It is the seat of Bloomfield Academy. The city was incorporated in 1898. Population, 1920, 14,181.

ARE (âr), the unit of land measure used in France. It is equal to 100 square meters, or 1,076.44 square feet. There are 100 ares in a hectare, which is equal to 2.47 acres.

ARECIBO (ä-rȧ-sē'bō), a seaport of Porto Rico, on the north coast of the island, 50 miles west of San Juan. It is located at the mouth of the Arecibo River, but the harbor is shallow, and cargo is discharged by means of lighters. Several churches, the government building, and a number of public schools are its chief improvements. It is on the railroad running along the northern coast and has considerable trade in sugar, tobacco, and fruit. Population, 1920, 9,612.

ARENA (ȧ-rē'nȧ), the portion of a Roman amphitheater where the combats of wild beasts and gladiators were exhibited. It was provided with four main entrances, and was inclosed by a wall fifteen feet high to protect the spectators. The floor was covered with sand. The term is now applied to places of combat and large summer theaters.

ARENDAL (ä'rĕn-däl), a city in Norway, on Bohus Bay, 41 miles northeast of Christiansand. It is built partly on islands and partly on the mainland, hence it has been called "Little Venice." It has railroad facilities and a good harbor, and carries a large export trade in iron and timber. Population, 1922, 11,250.

AREOPAGUS (ăr-ē-ŏp'ȧ-gŭs), or **Mars Hill**, a rocky eminence in ancient Athens, situated near the acropolis, famous as the seat of the celebrated council or court known by the same name. In this court sat as judges all who had filled the archonship without having been expelled, though the number varies considerably. The judges occupied seats in the open air. It is said that Pericles deprived the judges of some of their power and later they became responsible to the people, but the court still flourished in the time of Emperor Theodosius. Paul plead the cause of Christianity before this august court, the highest that Athens could boast. See Acts xvii., 19-22.

AREQUIPA (ä-rȧ-kē'pä), a city of Peru, in a state of the same name, on the Chile River, near the volcano Arequipa. It is surrounded by a fertile region, which also produces valuable minerals, including gold and silver. The city has railroad connections with Molliendo, its seaport, and also with Cuzco and several cities on Lake Titicaca. In the 16th century it was nearly buried in ashes thrown from the volcano of Misti, and it has since suffered severely from earthquakes. Population, 1920, 35,500.

AREZZO (ȧ-rĕt'sō), a city in Italy, capital of the province of Arezzo, about 50 miles southeast of Florence. It has railroad conveniences, two colleges, and an extensive museum. The manufactures embrace silk textiles and ironware, and it has a brisk trade in fruit and cereals. Arezzo was founded by the Etruscans, and is the birthplace of Petrarch, Cesalpino, Maecenas, and Pietro Aretino. Population (commune), 1921, 44,316.

ARGAND LAMP (är'gănd), a lamp invented by Aimé Argand, a Swiss chemist, in 1782, and designed for burning oil. In this lamp a wick in the form of a hollow cylinder is used, which permits a current of air to ascend, so the supply of oxygen is increased, thus diminishing the waste of carbon and increasing the amount of light. This burner, supplied with a glass chimney to create a draft, is used extensively in kerosene lamps.

ARGELANDER (är-ge-län'dẽr), **Friedrich Wilhelm August**, astronomer, born in Memel, Germany, March 22, 1799; died Feb. 17, 1875. He studied at Königsberg and in 1823 was made director of the observatory at Åbo, Finland, where he catalogued the fixed stars that have what he termed perceptible "proper motion."

ARGENSOLA (är-hän-sō'lȧ), **Bartolomé Leonardo de**, poet, born at Barbastro, Spain, Aug. 26, 1562; died Feb. 26, 1631. He became a canon of Saragossa and gave much attention to literature, especially poetry. His "History of the Conquest of the Moluccas" is a standard work on the subject of which it treats. His brother, Lupercio Leonardo de Argensola (1559-1613), is a lyric poet of much repute. The two brothers are often called the "Horaces of Spain."

ARGENTA, a city of Pulaski County, Arkansas, near Little Rock, on the Iron Mountain, the Cotton Belt, and other railroads. The features include the Y. M. C. A. building, city hall, high school, and many churches. It has oil mills and large railway shops. It was incorporated in 1903. Population, 1920, 11,128.

ARGENTINA (är-jĕn-tē'nȧ), or **Argentine Republic**, a republic of South America, next to Brazil the largest country of that continent. It is bounded on the north by Bolivia and Paraguay; east by Paraguay, Brazil, Uruguay, and the Atlantic; south by the Atlantic and Chile, and west by Chile. The length from north to south is about 2,100 miles, and the width ranges from 200 miles in the south to nearly 1,000 miles in the north. A portion of the island of Tierra del Fuego, the eastern part, and several islands along its coast are included as possessions of the republic; area 1,153,119 sq. mi.

DESCRIPTION. Along the western boundary are the elevated ranges of the Andes, which separate Argentina from Chile, and the northern part is more or less elevated and hilly. A few ranges of mountains characterize the country east of the Andean Plateau, such as the Sierra de Córdoba and the Ventana Highlands, but the larger part of the surface is slightly undulating in the central part and quite level along the Atlantic coast. Among the natural features of the country are its extensive plains, which occupy more than three-fourths of the surface. In the south are the plains of Patagonia, in the central part are the pampas, and in the northeastern section are the Chico plains. The plains are fertile in the region where rainfall is abundant and abound in luxuriant vegetation. Along the streams are belts of valuable forests, but the plains of Patagonia are almost treeless, though they have a growth of shrubs, herbs, and tufty grass. The soil is from three to eight feet deep, made largely by decaying vegetable matter, under which is a sedimentary subsoil made by alluvial deposits.

The drainage is wholly toward the south and east into the Atlantic. On the eastern border is the Uruguay, which separates the country from Brazil and Uruguay. The Paraná, which forms a part of the boundary with Paraguay, receives the Rio Salado and the Pilcomayo, and discharges a large volume of water into the Rio de la Plata. Among the streams that flow directly into the Atlantic are the Colorado, the Negro, the Chubut, the Deseado, and the Chico. Many fresh-water lakes abound in the tablelands east of the Andes, including lakes Chiquila, Amarga, Porongos, Musters, and Viedma. Lake Buenos Ayres, the source of the Deseado River, is in the south central part. Along the eastern shore are numerous inlets and bays, including the Bay of Samborombon and the gulfs of San Matias, Nueva, and San Jorge.

The climate ranges from the subtropical region of the north to the cold belt of the south. In the northern part the hottest months have an average temperature of 80°, while the extremes range from 30° in July to 105° in January. In the cold belt of the south the temperature frequently falls below the freezing point. A semiarid region stretches through the southern part, but the central and northern sections have an abundance of rainfall, from 30 to 70 inches, amply sufficient for all agricultural purposes. Sudden changes occur in the weather on the pampas, where the cool, dry winds from the south are frequently followed by the moist, hot winds from the north.

MINING. Although the mineral resources of the country are extensive, they have received but little attention. Mining is confined chiefly to the mountain districts in the west, where considerable quantities of tin, nickel, copper, iron, gold, silver, and precious stones are obtained. Marble of a good quality is found in the Sierra de Córdoba, but it is not quarried extensively. Mineral waters of a superior quality are abundant in the western highlands. Other minerals include petroleum, natural gas, salt, mica, and borate of soda.

AGRICULTURE. Farming is the most important industry, but the country is sparsely settled and admits of material development. The leading cereals grown in Canada and the United States yield good returns, such as wheat, barley, oats, maize, and rye, but wheat continues to be the most important crop. Among the minor farm products are cotton, tobacco, linseed, canary seed, rice, and sugar cane. Silk culture has been introduced successfully in the northern part, where the climate is particularly favorable for the cultivation of the mulberry tree. Other products include coffee, potatoes, peanuts, and hay. The country has large interests in the live-stock industry, especially in cattle, horses, swine, and sheep. Among the minor domestic animals grown extensively are goats, mules, and poultry. Immigration from Europe is having a marked and favorable influence upon the development of the industries, especially upon farming and stock raising.

MANUFACTURES. Comparatively little attention has been given to the manufacturing enterprises until within recent years. A large majority of the products consist of materials that are produced and partially finished for exportation, such as leather, lumber, and packed or cured meat. Flour and grist mills are operated in many sections of the country, and sugar refineries are well distributed throughout the region where sugar cane is grown. Among the general manufactures are boots and shoes, clothing, earthenware, furniture, chemicals, and farming machinery.

TRANSPORTATION. Argentina has an extensive coast on the Atlantic, and many of the larger streams are important as avenues for transportation. This is true in particular of the La Plata and the Paraná, which are navigated about 1,200 miles, and some of the larger tributaries are accessible by small craft. While the southern section is almost destitute of railroads, many lines have been built and are operated in the northern section. Buenos Ayres, Rosario, and Santa Fé are the chief railroad centers. A transcontinental line extends from Buenos Ayres to Valparaiso, a Pacific seaport in Chile. The lines in operation include a total of 25,500 miles. Electric railways are operated in many of the larger cities and towns, from which numerous branches extend to interurban points.

COMMERCE. Argentina stands at the head of countries in South America both in domestic and foreign commerce. Foreign trade is largely with Great Britain, Germany, the United States, Italy, France, and Belgium, in the order named, and the principal ports are at Buenos Ayres and Rosario. The imports somewhat exceed the exports, but both give evidence of considerable development the past decade. Among the leading imports are iron and metal goods, paper, textiles, chemicals, foodstuffs, and machinery. The exports include timber products, minerals, hides, cereals, flour, and dressed meat.

Government. Argentina is a constitutional republic, and the present constitution dates from 1853, but it was materially amended in 1860 and in 1898. The executive authority is vested in a president, elected for a term of six years, but he is not eligible to reëlection. He is assisted by a ministry of eight secretaries of state, who, like the president, are responsible to congress, the legislative branch. The senate consists of thirty members, two from each province and two from the capital, and the house of deputies is composed of 120 members. Justice is administered by federal and provincial courts, and the highest authority is vested in the federal supreme court. At present the country is divided into fourteen provinces and ten territories. Each province has its local executive, legislature, and system of courts, but the territories are administered under the direct supervision of the national government. Gold is the standard of value. The peso is the monetary unit, valued at about $.965 in the money of Canada and the United States. A peso has 100 centavos. The principal sources of revenue are import duties and excise taxes, but direct taxes are levied by the provinces and smaller subdivisions.

Education. The system of public schools was organized in 1870 and is supervised by the department of public instruction. Aid is given by the general government to numerous colleges and universities, but each province has direct charge of the public schools within its own boundaries. In this respect the educational system resembles that of Canada and the United States. All children between the ages of six and sixteen years are required to attend school, but the compulsory attendance provision is not enforced strictly in the sparsely settled districts. A number of technical schools and normal institutes for the training of teachers are in a flourishing condition. Spanish is the official and spoken language. The Roman Catholic faith is that of the state, but freedom of religion is guaranteed to all under the constitution.

Inhabitants. Nearly one-half of the people reside in towns and cities, a circumstance rarely met with in new and partially undeveloped countries. About one-third of the inhabitants are of foreign birth, and this element consists chiefly of Italians, Spaniards, Frenchmen, Germans, and English. Buenos Ayres, on the La Plata, is the capital and largest city. Other cities of importance include Cordova, Rosario, Tucuman, La Plata, Salta, and Corrientes. In 1927 Argentina had a population of 10,187,120.

History. The first European explorers of the region now included in Argentina were the Spanish, who visited the Rio de la Plata in 1516. They sailed under the leadership of Juan Diaz de Solis, who left Europe with an expedition to search for a southwestern passage to the East Indies. All who sailed with the company failed to return, and it is supposed they were captured and killed by the Indians. In 1519 the King of Portugal sent Magellan on an expedition to explore the southern part of South America. He sailed through the strait that bears his name and claimed a large portion of the mainland, including the Rio de la Plata and the present site of Buenos Ayres, for Portugal. By the end of the 16th century Argentina became a Spanish possession and continued as such until 1810, when it cast off the dominion of the Spanish crown. Ten years later independence was formally declared, but the country was not freed until after undergoing a series of wars. Spain recognized its independence in 1842. Buenos Ayres undertook to set up a republic in 1854, but it was defeated and obliged to reënter the confederation in 1859. Political corruption caused a revolution in 1890, after which the government became more efficient. Foreign trade increased greatly during the Great European War.

ARGENTINE (är'jĕn-tīn), a city of Kansas, in Wyandotte County, about four miles west of Kansas City, on the Atchison, Topeka and Santa Fé Railroad. It has electric lights, waterworks, and other conveniences. The city has manufactures of ironware, furniture, and tobacco products, and is the seat of large gold and silver smelting works. It was annexed to Kansas City, Kans., in 1910.

ARGON (är'gŏn), an element contained in the atmosphere, which possesses the property of being chemically inert, and was recently discovered by Lord Rayleigh and Professor Ramsey of England. It is estimated that one per cent. of atmospheric air is argon. This element is heavier than nitrogen but somewhat resembles it. The discoverers were each awarded a prize of $10,000, one from the French Academy of Science and the other from the Smithsonian Institution. The National Academy of Sciences of the United States awarded Lord Rayleigh the Barnard Medal in 1895.

ARGONAUTS (är'gō-nạts), in Greek mythology, a band of heroes who sailed in the ship Argo from Thessaly across the Black Sea to secure the golden fleece, which was guarded in a grove sacred to Mars. This task was imposed on Jason, in order that he might prove his valor and fitness for the throne of Iolcos. He not only secured the golden fleece, but returned safely to Thessaly, though many hardships were encountered on the return voyage. Among the famous Grecians accompanying him were Hercules, Pollux, Theseus, Castor, and Orpheus. See **Jason.**

ARGONNE, a forest region of France, on both sides of the Aire River, between the Meuse and the Aisne rivers, a short distance west of Verdun. It was the scene of heavy fighting almost throughout the entire war. On Sept. 26, 1918, General Pershing, with an American army, destroyed the German defenses at St. Mihiel and pushed northwest, carrying victory and capturing more than 5,000 prisoners. This cleared the Argonne Forest, relieved Verdun and opened the way toward Sedan.

ARGOS (är'gŏs), a city of ancient Greece, situated in the northeastern part of the Peloponnesus, in the region known as Argos. It was founded about 1500 B. C., and is believed to be the most ancient city of Greece.

ARGUS (är'gŭs), a creature mentioned in Greek mythology, and supposed to have had a hundred eyes, of which only two slept at a time. Juno employed Argus to watch the priestess Io, who had been transformed into a heifer. This being was lulled to sleep by Mercury, who played soothing tunes on the pipe of Pan, and was slain by Hermes. It is said that Juno afterward transferred the eyes of Argus to the tail of the peacock.

ARGYLL, or **Argyle** (är-gīl'), **Campbells of,** a family of Scotland raised to the peerage in 1445. The family includes a large number of historic personages, who were celebrated for their activities in Scottish and British history. Among the most prominent are Archibald, 2d earl; Archibald, 5th earl; Archibald, 9th earl; Archibald, 10th earl; John, 2d duke; and George Douglas Campbell (1823-1900), 8th duke. The eldest son of the last mentioned, John Douglas Southerland Campbell Argyll (born in 1845), married Princess Louise, the fourth daughter of Queen Victoria, in 1871. He became Governor General of Canada in 1878, which office he administered with much success for five years. In 1895 he entered the British Parliament and became Duke of Argyll in 1900. He died May 2, 1914.

ARIADNE (a-rĭ-ăd'ne), a Grecian myth taken as a personification of the return of spring. It is said Bacchus was away over winter, and on his return in the spring married Ariadne amid great rejoicing. This marriage was the prominent feature of her worship, and is said to have originated in Crete. Her fame is based largely upon the incident of rescuing Theseus from the labyrinth by means of a thread clue, after he slew Minotaur.

ARID REGION (ăr'ĭd), a tract or district in which the rainfall is not sufficient for the successful cultivation of crops. The line of demarkation between the humid and arid regions is usually irregular, being influenced more or less by the direction of prevailing winds, the character of the surface, and the time of year when the rains occur. It is assumed by most writers that the plains of North America lying between the Rocky Mountains on the west and the 100th meridian on the east comprise an arid region, and besides this large scope of country there are districts in the Rocky Mountains and the Pacific coast plain where the precipitation is too small to conduct agriculture without irrigation. A mean annual rainfall of 20 inches is the approximate minimum, but if the rains occur principally in the growing season less is required. Between the arid regions and those having sufficient rainfall is usually a belt of country in which farming is successful in relatively moist years and a failure in others. However, it is thought that the improvement of a prairie country by cultivation and the planting of trees cause rains to become more regular and abundant. This, for instance, is true of a large part of the Staked Plains, or Llano Estacado of Texas, which was formerly thought to be too dry for farming, but in recent years has become well settled by those interested in mixed farming and stock raising.

The arid region of North America extends from central Mexico to north central British America, but its boundary east and west is very irregular. The southern part of Alberta, Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, and the north central part of Mexico are included in this region. In addition are to be included the western parts of North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma, and a part of Idaho, northwestern Texas, eastern Washington and Oregon, and a large part of California. See **Irrigation.**

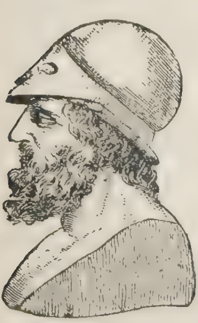
ARIES (ā'rĭ-ēz), the ram, a sign of the zodiac, the first 30° measured from the point at which the equator intersects the ecliptic. The sun enters Aries the 21st of March. At present the sign Aries is about 30° west of the original sign, in the constellation Pisces.

ARION (ȧ-rī'ŭn), a musician and poet of Greece, native of Lesbos, flourished about 625 B. C. Little is known of him, though it is certain that he was prolific as a poet and skillful as a musician. The only writing from his pen extant is part of a poem dedicated to Poseidon.

ARIOSTO (ä-rē-ôs'tô), **Ludovico,** famous poet, born in Reggio, Italy, Sept. 4, 1474; died June 6, 1533. His father at first designed him for the study of law, but an ardent taste for poetry absorbed his attention from an early age. He received a classical education, though much of the available time was devoted to music and poetical productions. Soon after completing his education his entire time was devoted to writing lyric poems in the Latin and Italian languages. Several of these were praised by literary critics for their elegance and style, and introduced him to the notice of the ruling sovereigns. His most famous production is the immortal poem "Orlando Furioso," published in 1515. Besides this production, he wrote many comedies, and superintended dramatic performances as well as the construction of a theater. His works as a whole were meritorious and greatly excelled all Italian productions written in the 15th, 16th, and 17th centuries.

ARISTA (ȧ-rês′tȧ), **Mariano,** soldier, born in the state of San Luis Potosi, Mexico, July 26, 1802; died Aug. 7, 1855. He served in the Spanish army until 1821, when he joined the Mexican revolutionists, and after successive promotions was placed second in command of the army of Mexico. Santa Anna expelled him for inciting a revolt, but he was restored to his rank in the army in 1835. He commanded against the French and was taken prisoner at Vera Cruz, but was soon released on parole, and in the war with the United States he commanded at Palo Alto and Resaca de la Palma. In 1850 he was elected president of Mexico. His administration was disturbed by a number of revolts, and he was finally driven from power and banished by Santa Anna. He died as an exile in Spain.

ARISTIDES (ăr-is-tī′dēz), surnamed *The Just,* statesman of Athens, born about 528 B. C. According to some writers he descended from wealthy parents, but Plutarch maintains that he was very poor and never enriched himself at the expense of the state. He fought with the Athenians at Marathon in 490 B. C., where he was one of the ten generals in command, being second in military rank to Miltiades. Afterward he became popular and was elevated to the office of archon, from which he was removed on account of the jealousy of Themistocles, but was recalled when Xerxes invaded Greece, and took part in the Battle of Salamis, in 480. He commanded the Athenians in the Battle of Plataea in 479, and was largely instrumental in attaining victory. Afterward he advocated a tax to defray the expenses of the Persian War, and public confidence in him caused his appointment to apportion the taxes. He died in the year 468 B. C. at an advanced age, and so poor that he was buried at the expense of the state. The country felt duly grateful for his services, and his children were granted doweries and landed estates.



ARISTIDES.

ARISTIPPUS (ăr-ĭs-tĭp′ŭs), the founder of the Cyrenaic school of philosophy, born in Greece about 400 B. C.; died about 350 B. C. Though little is known of his life, some of his theories have been exemplified by various writers. He was a student and disciple of Socrates, but differed widely from him in moral philosophy. It was his habit to wander from city to city and teach congregations who were eager to come to him for instruction. He appears to have ended his travels at Cyrene, where he died. According to his teachings, true temperance consists, not in abstaining from pleasure, but in being moderate in its enjoyment. Accordingly he indulged in splendid dwellings, rich clothing, and good living. However, he always remained thoroughly master of himself, no matter under what conditions, and made his doctrine and his teachings felt by personally complying with his precepts. He left no systematic plan or theory of philosophy.

ARISTOCRACY (ăr-ĭs-tŏk′rȧ-sy̆), a form of government by which the wealthy and noble, or any small privileged class, rule over the mass of citizens. It signifies a government of the best, or by the best. The ruling officers hold their position by right of birth or by appointment, and include mostly the nobility or chief persons of the state.

ARISTOPHANES (ăr-ĭs-tŏf′ȧ-nēz), eminent writer of Greek comedy, born in Athens about 448 B. C.; died about 380. He was the son of Philipus, and is the only writer of old Greek comedy of whose works we still possess a considerable number, although his history is not well known. He wrote fifty-four comedies, of which eleven are still extant. His writings place him far above his contemporaries. He surpasses many of his immediate successors in wealth of fancy, elegance of style, and beauty of language. His poetry was held in such high esteem by Plato that he called it "the temple of the graces." Many of his writings have been translated into the German and English. His work entitled "The Frogs" is a satire on Euripides. Other writings include "The Wasps," "The Knights," and "The Clouds."

ARISTOTLE (ăr′ĭs-tŏt-’l), the greatest of ancient philosophers, born in Stagira, a Greek colony of Macedonia, in 384 B. C.; died at Chalcis, in the island of Euboea, in 322. From his birthplace he was called *The Stagirite.* At the age of seventeen he began his studies at Athens, where he pursued them diligently for three years. Plato, his great teacher, called him "The intellect of his school," and he was the latter's favorite pupil. He became the teacher of Alexander the Great in 343, and, after the conquest of Persia, the great general presented him with about a million dollars. He was further aided by Alexander the Great in scientific researches, in that he received from him specimens of animals and plants with which he met while on his expeditions in Asia and Africa. At Athens, Aristotle taught in the Lyceum, a school or gymnasium near the city. It is said of him that he taught his pupils the problems of philosophy in the forenoon, which he did moving to and fro. The habit of walking almost constantly while teaching caused him to be called *The Peripatetic.* In the evening he gave public lectures to the people for their general information. He was a natural scientist and a close investigator. Among his principal works are "Politics," "Physics," "Ethics," "Rhetoric," "Logic," "Metaphysics," "Psychology," "Meteorology," and "History of Animals."

Aristotle has often been referred to as un-Greek in the character of his mind, for the reason that he neglected artistic form and adhered to "essential naked truth." While this may be true of his teachings and more or less of his writings, it remains certain that he was of purely Hellenic descent. The best biography written of him is that by Grote. In it is claimed that Aristotle left many books, a total of 146, but a number of these were fragmentary and of little value. From Grote's biography we learn that Aristotle passed twenty years with Plato, thirteen years of which were spent consecutively; that he came to Mitylene in 345; that after the death of Plato he went to Hermeas, where he remained three years; thence to Philip, and came to Athens in 340, when Alexander was fifteen years old. He taught in the Lyceum thirteen years, went to Chalcis in 322, where he died at the age of sixty-three years. The writings and works of Aristotle were far in advance of the common opinions of his time. He became better understood and more fully appreciated long after his death, and his theories on philosophy and mental science have had a marked influence upon the writings of all succeeding ages. Among the Greek writers he is ranked with the best, and is regarded the most efficient of the men who lived in his time.

ARITHMETIC (å-rĭth′mē-tĭk), a science that treats of numbers and of the art of computation by means of them. It is usually considered either abstract or practical. Abstract arithmetic includes notation, numeration, addition, subtraction, multiplication, division, fractions, measures, multiples, powers, and roots. Practical arithmetic embraces the application of the abstract with rules, such as reduction, compound addition, subtraction, multiplication, and division; proportion, aliquot parts, interest, profit and loss, etc. However, the fundamental principles of arithmetic are addition, subtraction, multiplication, and division, and these are employed more or less in all arithmetical computations.

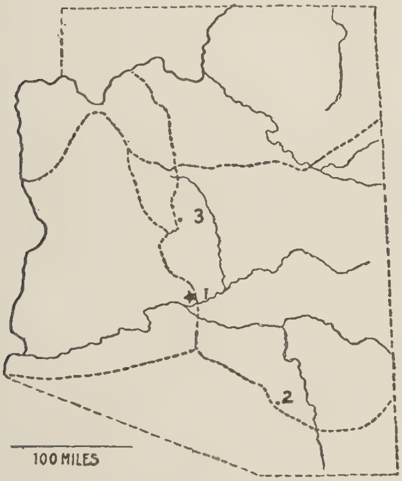
The ancients, even the Greeks and Romans, made little progress in this science, owing to their clumsy means of notation. The most important writings that have come down to us from them are those of Archimedes, Euclid, Nicomachus, and Diophantus. After the introduction of the Arabic numerals, which occurred about the 11th century, arithmetic began to assume greater convenience in form and came to be better known. The Arabic scale of notation is the one now universally used and consists of the following ten digits: **1, 2, 3, 4, 5, 6, 7, 8, 9, 0. Each digit is given a value** dependent upon its place occupied in a number made up of several figures. It increases in a tenfold proportion from the right toward the left in whole numbers, and decreases in a tenfold proportion from left toward right in decimal fractions. Thus any value from the largest to the smallest can be definitely stated by this system.

The Roman system came into use with the ascendency of the Romans. They employed several letters to express numerical values. The letters employed are the following: I, V, X, L, C, D, M, and express values in this order respectively: 1, 5, 10, 50, 100, 500, 1,000. When a letter is written after another letter of the same or greater value, they express together the sum of their value. Thus, II=2; XII=12; XXV=25; CX=110; MX=1,010. When a letter is written before another letter of greater value, the two together express the difference of their value. Thus, IV=4; IX=9; XL=40; XC=90; CM=900. A bar placed over a letter multiplies its value by a thousand. Thus, $\bar{\text{V}}$=5,000; $\bar{\text{L}}$=50,000; $\bar{\text{M}}$=1,000,000.

In the study of arithmetic the three stages of mental development involved should be carefully kept in view. The earliest stage requires a large proportion of work in the concrete. The faculties chiefly exercised at this time are observations, or perception, and memory, and a beginner is not able to formulate thought, or to derive benefit from abstract or formal statements of principles or processes. In the intermediate stage the reasoning faculties, such as abstraction and judgment, come into prominence, and at this time the student needs to acquire a clear perception of the definition and principle involved, and be able to state and define abtract terms intelligently. The ultimate stage is reached when the mental powers are so matured and trained that the student is competent to receive instruction from the abstract or formal statement of propositions. Definitions, principles, propositions, and statements of processes may be stated to a student at this time before the illustration or demonstration of the processes involved is given.

ARITHMETICAL SIGNS (å-rĭth-mĕt′ĭ-cal), the signs or symbols used to designate the operations to be performed, or the facts to be obtained. The following are the common signs used in arithmetic: + signifies that the numbers between which it is placed are to be added; ×, that the former is to be multiplied by the latter; —, that the latter is to be subtracted from the former; ÷, that the former is to be divided by the latter; =, that the number or the process is equal to the number following; and :, ::, : are signs used between the members of a proportional series, as 6:12::8:16. A period placed to the left of a figure, or a series of figures, indicates that they are decimal fractions, as .206.

ARIZONA (ăr-ĭ-zō'na), a State of the United States, bounded on the north by Utah, east by New Mexico, south by Mexico, and west by California and Nevada. The larger part of the western boundary is formed by the Colorado River. The breadth from east to west is about 335 miles, and the length from north to south is 350 miles. It has an area of 113,020 squares miles, of which about 100 square miles is water surface.



ARIZONA.
1, Phoenix; 2, Tucson; 3, Prescott.
Chief railways are shown by dotted lines.

Description. The surface is largely elevated and mountainous. The highlands consist of a portion of the Rocky Mountains and attain heights of from 12,000 to 14,000 feet. Among the principal ranges are the Mogollon Mesa, in the east; the Santa Ana and Dragon, in the south; the Granite Wash, in the west; the Santa Catalina, in the southeast; and the Gila, San Francisco, and Black Mesa, toward the center and northwest. The high plateaus and mountains are furrowed by rivers whose beds, in some places, are 6,000 feet below the level of the surface. Buttes and mesas characterize the aspect of the plains in many localities, and many of the streams are dry a large part of the year.

The drainage is by the Colorado and its tributaries. The latter include the Little Colorado, the Gila, and the Bill Williams Fork. The Salt and Rio San Pedro discharge into the Gila River. The Colorado, one of the great rivers of North America, passes through the northwestern part of Arizona and separates it on the western boundary from Nevada and California. It discharges into the Gulf of California after passing through a part of Mexico. It is navigable about 500 miles from its mouth, but navigation is somewhat hindered by the rapid flow of its waters. The total fall of the river within Arizona is more than 3,000 feet. In its course it flows through the Grand Canyon of the Colorado, whose vertical walls rise to a height of from 4,000 to 6,000 feet. These walls are vast sections of almost horizontal strata, and, with the smaller canyons of the tributaries of the Colorado, present well-marked geological formations in regular order to a depth of 25,000 feet.

Arizona is located in the arid region (q. v.) of North America, but the climate is healthful and the sky is clear a larger number of days than in any other part of the United States. The mean annual temperature of the northern part is 45°, while in the southern section it is placed at 69°. Rain falls more abundantly in the northern than in the southern part, being about 20 inches annually in the former, while in the southern half it ranges from 10 to 13 inches. Vegetation is correspondingly scant, but bunch grass and pasture lands are abundant. The soil in the valleys is fertile, which is true of most of the level land, but in some parts alkali occurs quite extensively in the soil. The plants and animals are about the same as those found in southern California and New Mexico.

Mining. Mineral-bearing land is found in a large part of Arizona, and the mining industry is being developed as rapidly as the transportation facilities will permit. In the production of copper the State takes high rank, having extensive and valuable deposits. In the output of this mineral Arizona exceeds Montana and Michigan, and the product is about one-fourth of the total output of the United States. Gold mining is next in importance, the annual output being about $5,750,000, and the output of silver is placed at $5,130,000 per year. Other minerals are lead, salt, tin, quicksilver, graphite, gypsum, and precious stones, including onyx, opal, garnet, and sapphire. Building stone is abundant. Near Holbrooke is a section where a large amount of petrified trees are found, frequently referred to as the petrified forest.

Agriculture. Stock raising is the chief industry, but irrigation on a large scale is fast extending all classes of farming. The government constructed the Salt River Dam, thereby redeeming a large scope of arid land, and irrigation is employed in the vicinity of Phoenix and other places. Alfalfa is an important crop and is grown largely. The cultivation of wheat, barley, and oats is receiving marked attention, and the acreage devoted to fruit culture is being extended largely, especially in the southern part, where the semitropical varieties are grown, such as almonds, figs, oranges, grapefruit, and raisin grapes. Potatoes, apples, and vegetables flourish in all parts of the State.

Manufacturing and Transportation. Manufacturing enterprises have been developed to some extent, though the smelting and refining of copper remain the chief enterprises. Among the general manufactures are flour and grist, butter and cheese, eathenware, and timber products. An abundance of coal and considerable other material of value are factors contributing to the development of manufacturing enterprises, especially in the preparation of material used in the building trades. The only navigable river is the Colorado, but it is available for navigation only in its lower course. Railroad building has received marked attention, and trunk lines of the Southern Pacific and the Santa Fé cross the Territory, furnishing convenient means of transportation to the east as well as to the Pacific coast. In 1922 the lines included a total of 2,350 miles and several electric railways were in operation.

Inhabitants. In 1900 there were only 1.1 inhabitants to the square mile, of which about twenty per cent. were of foreign birth, mostly Mexicans. Excellent schools are maintained by a system of taxation and public grants, including the two normal schools at Tempe and Flagstaff and the university at Tucson. The asylum for the insane is at Phoenix and the penitentiary at Florence. A number of libraries, benevolent and charitable institutions, and scientific and educational associations are maintained. Phoenix is the capital. Jerome, Prescott, Tucson, and Yuma are thriving business centers. Arizona, in 1900, had a population of 122,212, a gain of 125 per cent. in ten years. The Indian population was 26,480 Population, 1920, 333,273.

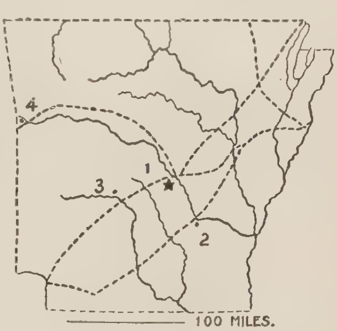
History. A powerful race resembling the Aztecs inhabited the region occupied by Arizona before it was visited by white men. This is evident from the fact that ruins of aqueducts, fortifications, and cities have been discovered in many of the valleys, and there are traces of large irrigation canals maintained by the early inhabitants. A Spanish expedition explored the country in 1539, and the following year a second expedition visited the section. The Apaches and other tribes of Indians resisted the pioneers who undertook to make settlements, and little progress was made until after the Mexican Revolution of 1827, when the mines that had been opened at Tucson and Tubac began to attract considerable attention and ranching began to yield returns. Arizona was acquired by the United States in 1848 as a result of the Mexican War, though a tract south of the Gila belonged to the Mexican state of Sonora, and this was secured by the Gadsden Purchase (q. v.). It was a part of New Mexico until 1863, when it was made a separate Territory. Efforts to have it admitted as a State were made in 1905, and Congress took some action to unite Arizona and New Mexico as one State, but the proposition was not accepted. It was finally admitted, in 1912, as the 48th State.

ARIZONA, University of, an educational institution located at Tucson, Ariz. It was established in 1885, is coeducational, and is attended by about 2,500 students. The library contains 90,000 volumes, and the courses include academic and higher branches of study. The buildings and grounds are valued at $2,585,000.

ARJISH (ar-jesh′), a river of Rumania, rises in the Carpathian Mountains, and flows into the Danube after a course of 175 miles. It passes through a fertile country.

ARK (ärk), the vessel built by Noah, and in which he and his family and many animals were preserved during the flood. It was 525 feet long, 87½ feet wide, and 52½ feet high, and was built to float and not for speed. In the Bible the word *ark* is applied to the basket in which Moses was found by the daughter of Pharaoh, and also to the ark of the covenant.

ARKANSAS (är′kan-sa̤), a south central State of the United States, bounded on the north by Missouri, east by Tennessee and Mississippi, south by Louisiana, and west by Texas and Oklahoma. The greatest length from north to south is 275 miles; breadth, 240 miles; and area, 53,850 square miles. It has a water surface of 805 square miles. The State was named from the Arkansas River, which flows diagonally through it from northwest to southeast. It is popularly called the Bear State.



ARKANSAS.

1, Little Rock; 2, Pine Bluff; 3, Hot Springs; 4, Fort Smith.
Chief railways are shown by dotted lines.

Description. The surface slopes toward the southeast, and in the direction of the Arkansas River, from elevations in the northwest. Along the Mississippi, particularly in the southeastern part of the State, are low and marshy tracts, subject to overflow where the low bottoms are not protected by artificial embankments, while the interior of the State is generally undulating. Much of the surface is highly fertile, especially the alluvial tracts in the eastern part. In the northern part are ranges of the Ozark Mountains, which extend into it from Missouri, and attain a height of about 2,800 feet. Smaller elevations wholly within the State, known as the Black Hills and the Washita Hills, stretch over a considerabe area, but are less elevated. The Arkansas River enters the State from Oklahoma, near Fort Smith, and joins the Mississippi 20 miles north of Arkansas City. This river and its tributaries drain the larger part of the State. The White River, which crosses the boundary from Missouri, receives the Black and the Cache rivers, and discharges into the Mississippi near the mouth of the Arkansas. The Saline, the Ouachita, and the Bartholomew are tributaries of the Red River. The Mississippi River, which forms the eastern boundary, is important as an avenue of commerce.

The climate as a whole is genial, though malarial fevers are not infrequent in the marshy districts during the warm summer season. The annual rainfall aggregates forty inches in the western part, and about sixty inches in the eastern part, while the mean annual temperature is placed at 61°. Hot Springs and other cities are popular resorts for invalids, especially those suffering with pulmonary diseases. The State has extensive and valuable forests, virgin growths of timber covering a large part of the surface. Among the chief varieties are the oak, yellow pine, hickory, maple, sycamore, cypress, hackberry, elm, palmetto, cottonwood, and black walnut. In the lowlands are extensive canebreaks, and the wild plum, persimmon, whortleberry, and other native fruits abound.

MINING. The region traversed by the Arkansas River has deposits of a fine grade of bituminous coal, and oil and gas are found in paying quantities in several parts of the State. An excellent grade of whetstone is made from salicious rock abundant in the mountains. Other minerals mined largely are bauxite or aluminum ore, zinc, lead, nickel, granite, and manganese. Slate, sandstone, limestone, and granite are quarried. Mineral waters are obtained at Hot Springs and other localities.

AGRICULTURE.. Farming is the chief occupation, more than half of the area being in farms. In the production of cotton, which is the most important crop, the State takes seventh rank. Corn, wheat, and oats are the most important cereals, in the order named, and hay and forage crops are correspondingly large. Apples, peaches, and strawberries are grown for the market. Stock raising is receiving marked attention, expanding as land is cleared and converted into pasture, and dairying has developed into a productive enterprise. Horses, cattle, mules, swine, and sheep are the principal domestic animals.

MANUFACTURES. Manufacturing has been of secondary consideration, but the large forests and extensive mineral interests are stimulating development of this branch of industry, particularly in the output of lumber products and machinery. Flour and grist, cotton-seed oil and cake, and tobacco products are manufactured extensively. The manufacture of cotton textiles has been increasing to a considerable extent the past decade, but the larger part of the raw cotton produced is still exported. Little Rock, Pine Bluff, and Fort Smith are the leading manufacturing and railway centers.

TRANSPORTATION AND COMMERCE. The Mississippi, which forms the eastern boundary, gives the State an outlet by water communication to many states of the Mississippi valley. Many of the rivers within the State are navigable during high water, including the Saint Francis, White, and Arkansas rivers. While communication by railway does not extend to all the counties, important lines pass through many sections of the State. These include the Missouri Pacific, the Frisco Lines, the Chicago, Rock Island and Pacific, the Saint Louis Southwestern, the Kansas City Southern, and many other lines. In 1926 the State had 6,000 miles of railroads. Electric railways are operated in the cities and many sections of the State where settlements are well established. Large quantities of fruit are transported to the northern markets during the early spring and summer. Among the leading exports are cotton, coal, timber products, and live stock. A large share of the foreign commerce is carried through the port of New Orleans, La.

EDUCATION. Advancement in educational affairs in Arkansas has been marked the past few years. This helpful uplift is due largely to laws passed by the Legislature in 1907, under which the county superintendency was established and the teaching of elementary agriculture was inaugurated in the rural schools. This law provided for the establishment of a State normal school for white teachers, located at Conway, a town situated about thirty miles west of Little Rock, and increased the State levy for school purposes from two mills to three mills. The University of Arkansas is located at Fayetteville and is in a flourishing condition, having more than one thousand students in attendance, and being supported by liberal appropriations from the State. Among the leading denominational schools are Ouachita College and Henderson College, at Arkadelphia; Gallaway College, at Searcy; Hendrix College and Central College, at Conway; Arkansas College, at Batesville; and Cumberland College, at Clarksville. Two institutions are maintained for the higher education of Negroes, including Philander Smith College and Arkansas Baptist College, both located at Little Rock. The State has about forty preparatory schools and academies of high rank. Most of the towns have good public school systems embracing work of the primary, grammar, and high school grades. Many educational associations are maintained and are doing much in arousing public sentiment in favor of better sanitary conditions, school libraries, and better equipment for the public schools of the State.

GOVERNMENT. The present constitution was adopted in 1874. It provides for State elections to be held biannually, at which the Governor and other State officers are elected for a term of two years. The right to vote is limited to those who have paid poll tax and resided in the precinct one month, in the county six months, and in the State a year. A Senate of 35 members and a House of Representatives in which the membership cannot exceed 100 comprise the legislative department. The judicial system embraces the supreme court, the circuit courts, and the county court. Local government is administered by the counties, municipalities, and townships. At Little Rock the State maintains institutions for the blind and deaf and the State penitentiary, and there is a State prison and a hospital for the insane in Pulaski County.

Inhabitants. In 1920 the State ranked twenty-fifth in the order of population, and the density was 24.7 people to the square mile. Immigration has not been large, averaging not more than about 14,000 per year. A large proportion of the people reside in small villages and rural districts, and not more than eight places have a population exceeding 4,000. The Negro population has been increasing more rapidly than that of the whites, and in the number of colored inhabitants the State ranks tenth. In religious affiliation, the membership in churches is represented largely in the Baptist, Methodist, Presbyterian, and Christian denominations, in the order named. Little Rock, the capital, is the largest city. Fort Smith, near the line of Oklahoma, Texarkana, Pine Bluff, Hot Springs, and Helena are among the thriving business centers. In 1900 the State had a population of 1,311,564, as compared with 1,750,995 in 1920.

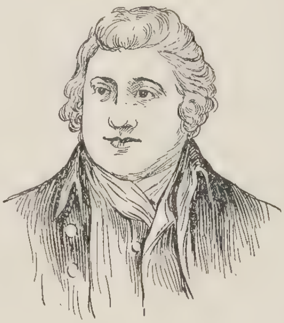
History. The authentic history of Arkansas begins with 1641, when a portion of it was explored by the Spaniards under De Soto. Subsequently explorations were made by the French under Joliet, Marquette, La Salle, and Hennepin, and in 1682 the region was claimed by France. Later it formed a part of Spain, was then ceded to France, and in 1803 was secured as a part of the Louisiana Purchase by the United States. The first permanent settlement was made by the French at Arkansas Post in 1695. It was organized as a Territory in 1819 and became a State in 1836, and in 1861 seceded to join the Southern Confederacy. A constitution prohibiting slavery was ratified by a vote of the people in 1868, and a new constitution was adopted in 1874. Since 1876 it has made rapid development of its resources, especially in agriculture and mining.

ARKANSAS, an important river of the United States, rises in Colorado, flows through Kansas, Oklahoma, and Arkansas, and joins the Mississippi after a course of 2,170 miles. The chief tributaries include the Cimarron, Grand, and Verdigris rivers. It drains a basin of 190,000 square miles, and its lower course is navigable for steamboats nine months in the year. There are periodical overflows near its mouth, the difference in depth between the dry and the wet seasons being not less than twenty feet. A large proportion of its water in the upper course is used for irrigation. Among the chief cities on its banks are Pine Bluff, Little Rock, and Fort Smith.

ARKANSAS, University of, a State institution located at Fayetteville, Ark., established in 1871. It is supported by Federal and State endowments and appropriations, and with it are affiliated a normal college at Pine Bluff and the medical school is at Little Rock. The value of its grounds and buildings is about $1,900,000. It has 125 professors and instructors and is attended by 2,000 students.

ARKANSAS CITY, a city of Kansas, in Cowley County, on the Missouri Pacific, the Atchison, Topeka and Santa Fé, and other railroads. It is finely situated on the Arkansas River about fourteen miles south of Winfield, and has considerable jobbing and retail trade. The manufactures include candy, utensils, ice, flour, machinery, earthenware, and dairy products. It has oil refineries, a well graded school system, two parks, a public library, and city waterworks. In the vicinity are deposits of petroleum and natural gas. The city was incorporated in 1871. Population, 1925, 14,003.

ARKWRIGHT (ärk'rīt), **Richard,** inventor, born in Preston, England, Dec. 23, 1732; died Aug. 3, 1792. He was the youngest of thirteen children, a poor boy without education, and worked as a barber until twenty-eight years old. Later he became a dealer in hair and discovered a hair dye, from which he secured a good income. At that time few machines had been invented for the purpose of spinning, and he undertook to discover a plan whereby cotton spinning could be done by machinery. After this time his entire attention was given to invention and discovery. His experiments soon led to the invention of a machine for spinning a hard thread suitable for warps. It consisted of rollers revolving at different rates between which the cotton was made to pass. The rollers that revolved the slower held the thread, while those revolving faster drew it out and twisted it. After completing a machine, he interested several wealthy men and induced them to assist him. His invention was patented in 1769, and, with the aid of his partners, he erected a mill at Nottingham and proceeded with the manufacture of warp. The machinery was at first driven by horse power, but proved expensive and inefficient. Accordingly, a second factory was erected at Cromford in 1771 at which water power was utilized. In 1775 he took out additional patents on machinery whereby carding, roving, and spinning could be done successfully. His machinery was ingenious and complicated, and by the aid of it one man was able to do as much work as 130 men could do in working by hand. This caused a feeling of unfriendliness against him among the laboring classes, who erroneously thought that the invention of


RICHARD ARKWRIGHT.

machinery was harmful to the interests of laboring men. Accordingly, mobs were organized and many factories that had been established were destroyed. Arkwright became involved in several lawsuits to maintain the validity of some of his patents, but succeeded in successfully establishing his prior rights. At the age of fifty he began to study the common branches of education, acting principally as his own teacher. By his unusual industry and devotion to business he amassed a vast fortune. In 1786 he was knighted by King George III.

ARLBERG (ärl'bĕrg), a mountain pass in Austria, between the Rhaetian and the Lech Alps. A highway was located and improved across the mountains in 1786 and it remained the only means of communication from points in Austria to Vorarlberg until 1880, when a railroad was built. This line passes through the Arlberg Tunnel, situated between Sanct Anton and Langen, a distance of six and a half miles. The tunnel has an elevation of 4,260 feet above the sea. The cost of construction was $7,500,000.

ARLES (ärlz), a city of France, on the Rhone River, 44 miles northwest of Marseilles. It has remains of a Roman amphitheater, and was the meeting place of several important councils of the church between 314 and 475 A. D. A cathedral and a college are its chief buildings. Silk textiles, hats, and wine are manufactured here. Population, 1921, 15,506.

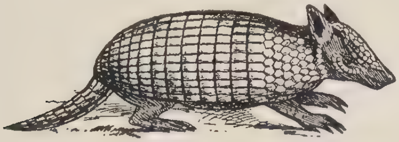
ARLINGTON (är'lĭng-tŭn), a town of Middlesex County, Massachusetts, six miles northwest of Boston, on the Boston and Maine Railroad. It has a fine public library and several commodious church buildings, and is popular as a residence suburb. It was formerly a part of Cambridge, from which it was separated in 1807 and called West Cambridge. Since 1867 it has been known by the present name. Population, 1905, 9,668; in 1925, 24,943.

ARLINGTON, a village in Alexandria County, Virginia, across the Potomac River from Washington, D. C. It was the home of Robert E. Lee, but was seized by the government at the time of the Civil War, and at present is the site of of the Arlington National Cemetery. The Lee mansion can be seen from Washington's Monument and other prominent places in the city of Washington, and is a fine specimen of Colonial architecture. The cemetery surrounds this building and is the last resting place of about 18,500 persons, including many of high military rank. The village is reached by the Alexandria and Arlington Electric Railway. Population, 1900, 3,200; in 1920, 5,850.

ARM (ärm), the upper extremity of the human body, on either side, extending from the shoulder to the hand. It consists of two portions: the arm proper, called the upper arm, and the forearm, or lower arm. The former has one bone, the humerus, which moves freely by a ball and socket joint upon the scapula, forming the shoulder joint, while the forearm has two bones, the ulna and radius. These two bones move on the lower end of the humerus, thus forming the elbow joint, and below articulate with the bones of the carpus, forming the wrist. Motion depends largely upon several well-defined muscles, including the deltoid, which lifts the arm from the side; the triceps, which extend the forearm; and the biceps, which govern largely the flexion or bending of the ulna and influence the movement of the humerus. Blood is supplied to the arm by the brachial artery, by the side of which large cords of nerves pass. The arm furnishes a fine example of muscular development, whose structure affords excellent illustrations of some of the principles of mechanics.

ARMADA (är-mā'dȧ), or **Invincible Armada,** a Spanish term applied to a powerful expedition sent by Philip II. of Spain in 1588 to conquer England. The prime object of the expedition was to strike a decisive blow against the Protestant interests, an enterprise that Pope Sixtus V. had assigned to him. It was placed in command of the Duke of Medina-Sidona. In July, 1588, the fleet set sail with 130 large war vessels, thirty smaller ships of war, 19,900 marines, 8,460 sailors, and 2,080 slaves, and was armed with 2,631 cannon. Soon after leaving Lisbon a heavy storm effected much damage, which required a refitting at Corunna. The design was to pass through the channel and at Flanders coöperate with the Duke of Parma, who had gathered a force of 35,000 men. Large forces were to be landed at several points on the British coast, and the Armada was to ravage the sea and occupy the English Channel. The English organized strong defenses and put their fleet under the command of Lord Howard, with Drake, Frobisher, and Hawkins as lieutenants. By prompt and brave attacks the landing of Parma was prevented, and by dexterous seamanship the English were enabled to inflict severe damage to the lumber-built vessels of Spain. At Dunkirk many Spanish vessels were destroyed or captured. It soon became apparent to the Duke of Medina-Sidona that the enterprise must be abandoned; accordingly, he attempted to sail round the north of Great Britain and return home, but his fleet was almost destroyed by severe storms. Many of the Spaniards attempted to save themselves from drowning by escaping to the shore of Ireland, but were captured and slain. The enterprise was entirely unsuccessful in accomplishing the object for which it started out. Spain lost seventy-two large vessels and over 10,000 men.

ARMADILLO (är-mȧ-dĭl'lō), an animal native of South America, where it inhabits the selvas and pampas in large numbers. It is commonly classed with the *Edentata* or toothless animals, but is not entirely toothless. Its teeth are molars and are so constructed that the upper fit in between the lower. It is covered with a hard, bony shell, made up largely of bony bucklers and polygonal plates, into which it draws its head and limbs for protection. The different species attain a length of from ten inches to three feet. Their food consists chiefly of roots, fruit, worms, and insects. The flesh is relished as an article of food by the native Indians. Armadillos are mammals; the female brings forth from two to ten young at a birth.


ARMADILLO.

ARMATURE (är'mȧ-tûr), an appliance used in permanent and electro-magnets, and first introduced in 1895. Its purpose is to preserve and increase the magnetism of the original bars. It is usually, but not always, constructed of thin sheet-iron rings, around an inner soft iron ring, with coils wound between toothed edges, and is held in place by wooden wedges. The shaft carrying the armature is made to revolve rapidly before the poles of the permanent magnet. By these means the electro-magnetic forces are caused to constantly change their direction, hence the currents produced are alternating. The number of magnetic poles in the field frame and the speed of rotation determine the number of times per second such currents change their direction. In the arc and incandescent lamps, and for certain kinds of electric motors, the alternating current is used largely. Other armatures are used for various purposes. A common form of armature consists of a piece of soft iron placed in contact with the pole of a magnetic bar to preserve its magnetism while not in use. When used in this form, it is commonly termed the *keeper*. When a horseshoe magnet is laid aside, it should not be separated from its armature, and straight-bar magnets should be laid side by side in pairs.

ARMENIA (är-mē'nĭ-ȧ), an ancient country of Western Asia, located between the Caspian Sea and Asia Minor. It includes the northwestern part of Persia, the southern region of Transcaucasia, and the northeastern section of Asiatic Turkey, and formerly had an area of 137,000 square miles. The surface is characterized with high tablelands traversed by mountains, of which Mount Ararat is the most prominent, and much of the region is drained by the Tigris and Euphrates rivers. A part of the drainage is by the Hayls into the Black Sea and by the Aras or Araxes into the Caspian Sea. The climate is variable but generally heathful. The rainfall is scant, the winters are severe, and the summers are hot.

The district includes numerous Persian and Turkish settlements, and in the cities are many Jews. The Armenians, like the Jews, are widely scattered in different countries. Wars between them and the Turks have been numerous and were frequently attended with massacres and rank cruelty, causing Russia and other countries to threaten intervention and the establishment of a protectorate. In 1895 incursions of Kurdish soldiers committed revolting atrocities with the avowed intention of exterminating the Armenians and populating the district with Mohammedans. This almost led to international complications and a dismemberment of the Turkish empire, for the reason that the Sultan of Turkey, who was sometimes called "The Sick Man of the East," was largely in sympathy with the opponents of Christianity. The Turkish government promised reforms to a joint commission made up of representatives of England, France, and Russia. After the World War, in 1920, Armenia was allotted an area of 11,680 square miles and became a republic. The following year it declared itself a part of Soviet Russia. It has a population of 834,475. Erivan is the seat of government.

Armenia was once a powerful kingdom, and was conquered in 325 B. C., by Alexander the Great. It remained subject to the Macedonians or Syrian-Greeks nearly 200 years, when it became independent and was divided into Armenia Minor and Armenia Major. The former was made a Roman province in 70 A. D., and was for a time governed by the Byzantines, the Arabs, and the Persians, and became a possession of Turkey in 1541. Armenia Major was conquered by the Parthians about 150 B. C., and passed through successive wars and under the control of different nations until 1828, when it was made Russian territory. At present the entire region that comprised ancient Armenia is divided among the Turks, the Russians, and the Persians. To unite the Armenians into a nation has been the ambition of these people, but they remain scattered over Asia Minor and a considerable number have emigrated to Europe and America.

The Armenians were adherents to the Zoroastrian religion until about 285, when Christianity was introduced by Gregory the Illuminator, under whose missionaries the king, Tiridates III., was converted. A considerable number belonged to the Roman and the Greek Catholic churches, but the greater part adhere to a sect of Christians formerly known as the Monophysites, from which the Armenian church was evolved at an early period in the history of Christianity. They are industrious, intelligent, peaceable, and faithful to their church and to their traditions. The Armenian language is classed with the Indo-European family of languages, being associated with the Iranic group, but the spoken form is somewhat mixed with words derived from the Turkish and Persian dialects. They have a considerable literature, which includes a number of representative works on religion, history, and the sciences. The Bible was translated into the Armenian language as early as the 5th century, the translation being by Isaac, the Armenian patriarch, and is from the Septuagint version.

ARMINIUS (ar-mĭn'ĭ-ŭs), celebrated chief of the German tribe called Cherusci, born about 18 B. C.; assassinated in the year 21 A. D. He became a Roman citizen in youth and attained a high rank in the Roman army. On returning to his native land, he found Quintilius Varus, the Roman Governor, oppressing the Germanic tribes and endeavoring to Romanize them. Accordingly he organized an uprising, calling to his aid tribes as far as the Elbe, to overthrow Roman supremacy. In a three days' battle at Teutoburg he completely annihilated the army of Varus, who was so overcome with remorse that he took his own life. When a report of this victory over the Roman army reached Rome, it caused the greatest consternation and excitement. Emperor Augustus, now old and weak, repeated the words, "Varus, Varus, give me back my legions!" In the years 14 and 16 A. D., Arminius led two successive compaigns. With a large army he met a force under Germanicus and forced him into retreat. The following year Germanicus came again with a large navy on the rivers and an army of 100,000 men, and, although temporarily successful, he was eventually defeated. This was the last Roman army that marched beyond the Rhine. Arminius has gone down in history as the German liberator, an appellation properly applied, since he vanquished the Romans on the plains called Woman's Meadow, with the effect that they no longer laid tribute on the German people. The death of Arminius occurred through the treachery of a relative. Many songs praising his valor are still sung by the German people.

ARMISTICE (är'mĭs-tĭs), a short suspension of hostilities between two armies or two nations at war, concluded by mutual agreement. An armistice is usually agreed upon when an endeavor to make peace is pending, or when both parties are exhausted. A very notable example is the armistice of the 25th of February, 1756, when five nations of Europe, then at war, agreed to a temporary suspension of hostilities with the view of concluding peace. The armistice may be either *general* or *particular*. The armistice which concluded the Great European War was signed Nov. 11, 1918, hence Armistice Day is celebrated November 11, which is a national holiday in many countries.

ARMOR (är'mẽr), the defensive arms used as a covering to protect the body, worn especially in war as protection against the weapons of a foe. In ancient times this custom was general. Homer describes the heroes of the Trojan War as equipped with armor. The custom of wearing armor reached its greatest development in the age of chivalry, when a warrior was almost entirely covered. The early Britons bore little other armor than their shield, but during the Norman conquest the Anglo-Saxons were fully equipped with this character of protection. When gunpowder began to be used largely in warfare, these appendages went rapidly out of use. In modern warfare life is protected by the construction of breastworks and forts, and armor plate is used to protect ships for the same purpose.

ARMOR PLATE, the name applied to the strong iron or steel plates used to cover warships with the view of rendering them proof against gun and cannon fire. The first use made of armor plate in naval warfare was in 1782, in the attack on Gibraltar, when the French used bars of iron to protect the hulls of their wooden ships. An increased demand for armor followed the combat of the Monitor and the Merrimac on Hampton Roads in 1862, and since then much thought has been given to the problem of obtaining the best protection that can be devised to overcome the destructive force of a modern steel-capped projectile. It has been found that the best armor plate is made of different varieties of steel, a hard surface to break up the projectile, or to deform it so as to lessen its power to penetrate, and this is backed up by a tough composition which will not crack easily. Nickel steel combines hardness with toughness and its power to resist penetration is about twice that of wrought iron. The larger warships are protected by plates about a foot thick, and a single plate is about nine feet wide and eighteen feet long. Between the plates and the iron frame of the ship is a packing of teakwood or something similar, which serves to lesson the concussion when the armor plate is struck by projectiles. A large ship carries about 4,000 tons of armor. The Mersey works in England, the Krupp works in Germany, the Carnegie works in Pittsburg, and the works of the South Bethlehem Steel Company at South Bethlehem, Pa., are the most noted manufacturing establishments where armor plate is made.

ARMOUR (är'mur), **Philip Danforth**, capitalist, born at Stockbridge, N. Y., May 16, 1832; died in Chicago, Jan. 6, 1901. He was born on a farm, and attended public schools at Stockbridge. In 1852 he made an overland trip to California, a part of the distance on foot, with the object of getting advantage from the gold excitement, and after four years returned east to engage in the grain and warehouse business at Milwaukee. He removed to Chicago in 1875, where he joined his brother, Herman O. Armour, as a dealer in grain and pork. The business was successful, and he became the owner of a large number of grain elevators and did an extensive export business. He was as enterprising in the support of education as he was in business, endowing institutions to the extent of $2,500,000, most of which was given to the Armour Mission and the Armour Institute in Chicago.

ARMS (ärmz), the weapons used for offense and defense in times of war. Some arms are used both for offensive and defensive operations, but there are some designed only for one of these purposes. Among those intended for offensive operations are pistols, rifles, muskets, swords, bayonets, machetes, and cannon; while those designed for defensive purposes are shields, cuirasses, greaves, and helmets. The class of arms used in warfare depends entirely upon the state of civilization common to a people. In ancient times, and among savage people in modern times, the bow and javelin were favorites for long range, and the straight dagger for close fighting. The Greeks used heavy spears at long range, and generally employed short swords when contending parties engaged in a hand-to-hand combat. In Macedon, Alexander the Great used the pike, a weapon about twenty feet long, to form a phalanx with the view of presenting an impregnable wall against both infantry and cavalry. This form of weapons continued in use more or less during the early civilization of Europe, although the Romans preferred and used extensively a short massive javelin six or seven feet long, which they hurled at their antagonists, and in short-range fighting employed the broadsword. They moved and operated in such a manner that each man had ample room to wield his instrument of war and inflict the greatest possible damage upon the enemy.

The Middle Ages witnessed the use of cavalry armed with steel-pointed weapons. The lance, battleax, two-handed sword, and mace were peculiar to this period. At that time the lance was a weapon about eighteen feet in length, with a butt end almost a foot in diameter some distance from the extremity, and was designed to fit the arm. The warriors of Scotland, Gaul, Germany, and other regions used either pikes, spears, halberds, or bills with heavy sideblades.

Modern firearms date from the 16th century. The first to be used was the matchlock musket. However, the early pattern was so heavy that a rest was required when taking aim, and later it was supplied with a bayonet, designed to give the musketeers means of defense when in close contact with the enemy. The invention of the musket added greatly to the use of powder as a means of aggressive operation. Arms of this class were used largely in the American Revolution, and in the Revolution of France in 1789. Subsequently many improvements were made in all classes of firearms. The percussion lock, revolving pistols, breech-loading rifles, self extracting and loading magazine guns, and arms especially designed for the use of powerful explosives have all had a marked influence in offensive and defensive warfare. In the war with Spain in 1898 the United States supplied her army with the Krag-Jorgensen gun, one of the newer inventions. This was superseded in 1904 by the Springfield rifle. Germany uses the Mauser rifle, suitable for long range. The British now use the Enfield and the Metford rifles, each of which has a magazine holding ten cartridges suitable for quick fire.

ARMSTRONG (ärm'strŏng), **John,** soldier, born at Carlisle, Penn., in 1758; died April 1, 1843. He enlisted in the Revolutionary army while a student at Princeton, in 1775, and became aid to General Hugh Mercer, whom he bore from the battlefield when mortally wounded at the Battle of Princeton. Subsequently he was promoted to the rank of major. After the war he returned to Carlisle and was elected secretary of State, and later became adjutant general of Pennsylvania. In 1800 he was elected to the United States Senate, and later was sent as minister to France and still later to Spain. He also served in the War of 1812. He is the author of "The Review of General Wilkinson's Memoirs" and "The History of the War of 1812."

ARMSTRONG, Samuel Chapman, educator, born at Wailuka, Hawaii, Jan. 30, 1839; died May 11, 1893. He was the son of an American missionary, studied at the Oahu College, and when a young man came to the United States. At the beginning of the Civil War he entered the Union army, and was mustered out of service when the war closed with the rank of brigadier general of volunteers. From 1865 until his death he was principal of the Manhattan Normal and Agricultural Institute. He made a special study of educating the Negro and Indian races.

ARMSTRONG, William George, engineer and inventor, born at Newcastle-upon-Tyne, England, March 23, 1810; died in 1900. He became interested in engineering at an early age. In 1858-63 he was government engineer of rifled ordnance at Woolwich, and in 1882 was chosen president of the Institution of Civil Engineers. He was created a peer in recognition of his success, and degrees were conferred upon him by the universities of Oxford and Cambridge. Among his inventions are the hydro-electric machine for developing frictional electricity, the hydraulic crane, and a kind of cannon known as the Armstrong gun. The last mentioned is a rifled ordnance gun, made of spirally coiled wrought-iron bars, in which a lead-coated projectile is used, so constructed that the bullet in its flight assumes a rotary motion.

ARMY (är'mȳ), a body of men enlisted, brought together, and so drilled, disciplined, and armed as to form a vast movable force for offense and defense in warfare. It may comprise the entire body of military men employed by a nation, or a portion of it under a particular commander. To be of greatest efficiency it must be perfect in organization and discipline, otherwise it is not available for the highest utility in action. A well constituted and disciplined army implies a trained leader, who communicates orders to subordinate commanders, and they again transmit to others of inferior rank, until, by regularly recognized order of transmission, the original command is communicated to the private soldier. It is necessary that the army be divided into groups gradually decreasing in size so that every portion may be not only commanded with facility, but clothed, fed, armed, and paid. In early times warfare was conducted in a stealthy manner from forest, marsh, and wilderness, led by the most daring and reckless. In modern times war has advanced to an art and is conducted by men who have been trained at institutions designed to give insight to and skill in managing large affairs.

ANCIENT ARMIES. The earliest history of organized armies comes down to us from the 16th century B. C. From this it appears that Sesostris, an Egyptian king, maintained a regular army, equipped, disciplined, and salaried. He divided his kingdom into thirty-six military provinces, established a national militia, allotted lands for the support of the soldier, and used this army both in offensive and defensive warfare. With it he became a conqueror of Northern Africa and a large part of Western Asia. Later the Persians extensively fostered military art. They organized a standing army, established garrisons, equipped infantry and cavalry, and provided rules of discipline. The Greeks maintained a national militia in various small states, which united in one great army in times of foreign war. By means of their superb organization and strict discipline they gained the great victories of Marathon and Plataea. The phalanx was originated by the Spartans, while the Athenians organized troops of cavalry to cover the front of their army and harass the enemy in the rear. Philip, the father of Alexander the Great, established the world's second standing army, added to the efficiency of the phalanx, and made Macedonia strong in war. To him is due the early use of the pike, a weapon about twenty feet in length and efficient in warfare, which, glittering in the hands of a solid phalanx, made an almost impregnable array of muscle and steel. In Rome, about 200 B. C., all able-bodied men between the ages of seventeen and forty-six were liable to service upon a call for military duty. The Roman soldiers were trained from early childhood, as a means of securing both muscular development and efficiency in discipline. Magistrates enrolled the names of those liable to military duty, from which lists were chosen the legions of the Roman army, a military force excelling all others then known. With a gradual decline in discipline, and a draft of slaves and criminals into the service, the decline of Roman power commenced.

MEDIEVAL ARMIES. It is not strange that the decline of Rome and the barbarian conquests paved the way for a decline of skillful warfare, which continued until all organized tactics were lost. The invaders from the north possessed little learning, and relied upon personal bravery and daring to secure the fortunes of war. The armies of the Gauls and Germanic tribes represented the nation. During the prevalence of the feudal system national armies again appeared, and each chief or baron possessed a small army, well equipped, but too small for great effect. When the Crusaders organized under a great cause to oppose a common enemy, they discovered the need of organization and discipline. They, accordingly, began to organize large forces of foot soldiers, which took the place of cavalry. The invention of gunpowder effected great changes, but progress in securing its general use was not rapid for the reason that guns and cannon were unknown, and the art of making them was slow in developing. Besides, each knight was ambitious to distinguish himself, and preferred to dash forward by himself and engage in personal combat, rather than lead an army, direct its movements, and gain distinction by leadership.

MODERN ARMIES. With the use of firearms and increased facilities for providing them on a larger scale, came gradual changes in modern military affairs. The first standing army of modern times is ascribed to Turkey, where the Janizaries organized an efficient military body in the 14th century. However, the modern military system dates from the time of Charles VII. of France. About the middle of the 15th century that king of France first organized an army of 9,000 men, and afterward added 16,000 more. During the Thirty Years' War, including the period of 1618-48, Gustavus Adolphus experimented in the use of infantry. His method was to spread the forces of infantrymen out to a great width, while his opponent, Wallenstein, preferred to mass them in a more solid front. In the reign of Louis XIV. armies were grouped into brigades and divisions; while Frederick the Great a hundred years later, won his victories because of skill in discipline. On account of prolonged wars military service was made legally compulsory in France in 1798. Under this statutory requirement every male citizen between the ages of twenty-one and twenty-five years was liable to four years' service. This plan of Napoleon was later adopted by other European nations.

At present most nations have a standing army constituted of several corps, with which is associated a body of cavalry, together with army reserves of two classes, one subject to immediate call and the other a militia or second reserve.

England is the only one of the great powers of Europe in which military service has not been made compulsory, but the recent war in South Africa and the unrest shown in India caused a general agitation more or less to such measures. The time of actual military service varies in different countries from six months to fifteen years, and, besides this, there are annual periods when those subject to military duty are required to pass a limited time in drill and reviews by officers high in authority. The cost of maintaining these armies is enormous, and in recent years several organized efforts were made to secure a general reduction in standing armies. An international conference was held at The Hague in May, 1899, at the suggestion of Czar Nicholas II., for the purpose of promoting general disarmament. All the great powers were represented at this conference and at several held since, and the evils of militarism were freely discussed. While the deliberations have led to no immediate results, they have awakened inquiry, and may yet lead to a condition under which the industrial classes will be largely freed from excessive taxes necessitated by large armies and navies.

In the United States the army is authorized by the Constitution. According to its provisions the President is commander in chief of the army and navy. Congress has the power to raise and support armies, to regulate them, and to provide for the execution of the law, the suppression of insurrections, and the repulsion of invasions. Congress several times placed a general limitation on the number of men that are to constitute the regular army, but in times of war the President calls for volunteers that aggregate many times the number usually maintained. In 1790 the regular army as fixed by Congress included 1,216 men; at the commencement of the War of 1812, 25,000; during the Mexican War, 29,000; at the beginning of the Civil War, 12,000. The law of 1874 limited the standing army to 25,000. In 1929 the actual strength was 134,505 men, of whom 96,366 were in the United States and the remainder were in Hawaii, Porto Rico, the Philippines, etc. The highest number of men ever called into service was during the Civil War, when it aggregated 2,759,049 men and officers. The army of the Confederate States aggregated 1,100,000 men, thus making the total number engaged on both sides about four million men. The regular United States army in 1928 consisted of 125,195 men and officers. At the beginning of the Great European War the total American man power was 22,000,000. The army mobilized consisted of 3,665,000, of which 1,993,000 were transported overseas. Canada mobilized 450,556 men and transported 383,523 overseas.

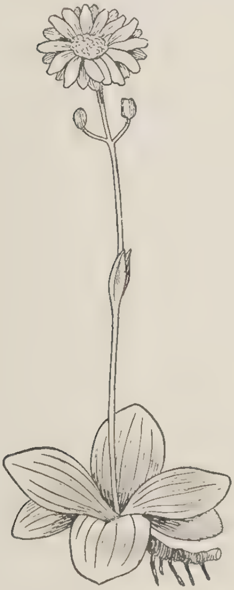
ARMY WORM, the larva of a night flying moth, so named from its habit of moving in colonies of large numbers. It attains a length of about one and one-half inches, and may be distinguished easily by the greenish-gray color and yellowish stripes. Army moths make their appearance periodically, and sometimes prove very destructive to crops and other form of vegetation. The best method to destroy them is to plow deep furrows, and, when large numbers of the worms have fallen into the channel, they may be killed by burning straw spread loosely, or by dragging a heavy log over them. The log should be about ten feet long and slightly pointed at the end to prevent pushing the ground as it is pulled by a team of horses. These pests are quite common in North America, especially in the United States, but they do not frequently become troublesome.

ARNAULD (är-nō′), **Antoine,** advocate, born in Paris, France, in 1560; died there Dec. 29, 1619. His family traced its lineage to wealthy ancestors of Auvergne, and was noted for distinguished services in civil and military affairs. He obtained a liberal education, became a successful advocate, and wrote a number of works against the Jesuits. He translated several ancient writings, among them Josephus's "History of the Jews."

ARNDT (ärnt), **Ernst Moritz,** patroit and poet, born on the island of Rugen, Dec. 26, 1769; died in Bonn, Germany, Jan. 29, 1860. After attending public and private schools, he entered the University of Greifswald, later studied theology at Jena, and subsequently traveled in many countries of Europe. In 1806 he became professor of history at Greifswald, in which capacity and in writing he induced a strong feeling against Napoleon. His chief work, "Der Geist der Zeit" ("The Spirit of the Times"), was published in 1807, and was the means of arousing the national consciousness. The threatening danger of the rise of Napoleonic influences caused him to settle for a time in Stockholm, where he served the Swedish government three years. Some of the leading patriotic songs of Germany, which are still the most popular among the nationalists, are from the pen of Arndt. These include "Husaren heraus," "Was blasen die Trompeten," and "Vas ist des Deutschen Vaterland." In 1818 he became professor of modern history at Bonn, where he gave offense by his liberal views on government, and was restrained from teaching history for a period of twenty years. He was chosen a deputy of the Frankfort parliament in 1848, but later withdrew and settled at Bonn to engage in literary work, where a fine monument was erected to his honor in 1865. His publications, entitled "War Songs" and "Catechism for the German Warrior," are still exceedingly popular.

ARNHEM (ärn′hĕm), or **Arnheim,** a city of Holland, capital of the province of Gelderland, situated on the Rhine, thirty-five miles southeast of Utrecht. It has a Reformed Church dating from 1452, in which is the tomb of the Duke of Gelderland. Other buildings of note include a museum, a public library, and a normal school. The favorable location on the Rhine and several railroads make it important as a commercial center. The trade is chiefly in cereals and clothing, and it has manufactures of furniture, machinery, and scientific instruments. Population, 1919, 64,685.

ARNICA (är'nĭ-kȧ), a genus of plants belonging to the *Compositae* order, many species of which yield an essential oil and a resinous matter called *arnicin.* A tincture of it is used as an external application for chilblains, bruises, and wounds. The plant is native to the mountain districts of Middle Eurasia. It grows to a height of about two feet, has a perennial root, and bears a dark golden yellow flower. A species sometimes called mountain tobacco is native to Central Europe.


ARNICA.

ARNIM (ar'nĭm), **Harry Karl Kurt Eduard von,** diplomat, born in Pomerania, Germany, Oct. 3, 1824; May 19, 1881. After died in Nice, France, attaining a liberal education, he engaged in politics, and in 1864-70 was Prussian ambassador at Rome. He was awarded the title of graf, served as ambassador to France in 1872-74, in which capacity he displeased Bismarck, and was prosecuted on a charge of purloining public documents. In 1874 he voluntarily retired into exile, and the sentence of five years against him was never enforced.

ARNIM, Ludwig Joachim von, poet, born in Berlin, Germany, Jan. 26, 1781; died Jan. 21, 1831. He acquired a liberal education, spent several years in traveling to trace the sources of current folk songs and legends, and devoted himself to literature. In 1811 he married Bettina von Brentano, who afterward became celebrated as Bettina von Arnim and famous for her acquaintance and correspondence with Goethe. His chief publications include "Berthold's First and Second Life," "Halle and Jerusalem," "Collection of Novels," and "Ariel's Revelations." His wife was born at Frankfort, April 4, 1785; died in Berlin, Jan. 20, 1859. She is the author of a number of valuable works, several of which are based upon her correspondence with Goethe in 1807-11.

ARNO (är'nō), an important river of Italy, rises in the Apennines, and after a course of 140 miles flows into the Mediterranean Sea. The source of the Arno is 4,450 feet above the level of the sea. It is navigable for barges as far as Florence. A canal connects the Arno with the Tiber at Arezzo. The valley through which it flows is highly fertile.

ARNOLD (är'nold), **Benedict.** army officer, born in Norwich, Conn., Jan. 14, 1741; died in London, England, June 14, 1801. He secured a good common school education and some knowledge of the higher branches, and began an apprenticeship in a drug store. Later he made a trip to Honduras, where he engaged in a duel with an English sea captain, on account of reflections made by the sea captain on the people of New England. When the Revolution broke out, he joined the "Green Mountain Boys," and rendered valuable assistance to Ethan Allen in capturing Fort Ticonderoga, and four days later himself captured Saint John's. In the autumn of 1775 Washington dispatched him with 1,100 men to assist in the siege of Quebec, where he was wounded. His gallant service at Quebec caused his promotion to the rank of brigadier general, in which capacity he commanded on Valcour Island, in Lake Champlain. In October, 1776, he was defeated by a British flotilla, but effected a skillful retreat.

In 1777 Congress raised five of his inferiors in rank to be major generals and this slight made a deep impression upon him. However, his gallantry at the Battle of Ridgefield, in Connecticut, caused Congress to regard his services to the country in a more appreciative mood. He was soon after made major general, and took an efficient part in the campaign against Burgoyne. At Fort Stanwix he dispersed Saint Leger's force, and was in command of the left wing in the first Battle of Saratoga, where his horse was killed under him and he was again wounded. He next commanded in Philadelphia, was court-martialed on trivial charges, and later reprimanded by Washington. In 1780 he was appointed to the command at West Point, on the Hudson, then one of the most important positions in the colonies, and while there intrigued with Clinton for the betrayal of that fort to the British. The negotiations were carried on with Andre, who was captured and the scheme frustrated. Arnold fled to the British army, where he was given a sum of money and a command. Early in 1781 he led a British force into Virginia and made an attack on New London. The British government gave him 13,400 acres of land in Canada, and his sons received commissions in the British army. He went to London in 1782, where he was despised and shunned. According to tradition, he regretted his treason and so expressed himself before he died.

ARNOLD, Sir Edwin, poet and journalist, born in Rochester, England, June 10, 1832; died March 24, 1904. He graduated at Oxford in 1854, and became president of the Government

Sanskrit College in India. His reputation is due largely to a wide range of knowledge in Oriental languages and literature and to his many literary productions. On his return to England in 1861, he became editorial writer on the *Daily Telegraph.* In this capacity he enlisted the aid of the New York *Herald* to equip the famous expedition of Livingstone for explorations in South Africa. His own country and a number of others bestowed upon him many distinctions. In 1889 and 1891 he lectured in Canada and United States. Among his writings are "The Light of Asia," "Indian Songs of India," "The Light of the World," and "Pearls of Faith."

ARNOLD, Matthew, prose writer and poet, born at Laleham, England, Dec. 24, 1822; died April 15, 1888. His education was secured at Winchester, Rugby, and Balliol College, Oxford, and later he was fellow at Oriel. His father, Dr. Arnold, of Rugby, took a deep personal interest in his education and success, and on account of eminent scholarship he became known as the "Apostle of Culture." While his works are not read as extensively as those of Browning and Tennyson, he may justly be assigned a place among the leading poets of his time. He was school inspector from 1851 to 1866, traveled and attended to literary work, and was elected professor of poetry at Oxford University in 1857, which position he held two years. He ranked high as a critic, a line of literary work in which he attained the general confidence and approval of scholars and writers. Among his productions are "Lectures on Translating Homer," "Essays on Criticism," "Lectures on the Study of Celtic Literature," "American Lectures," and "Civilization in America."

ARNOLD, Thomas, known as Arnold of Rugby, educator and author, born at West Cowes, Isle of Wight, June 13, 1795; died in Rugby, June 12, 1842. At an early age he moved to Winchester, where he was known as an indolent, restless boy. While at the Winchester School he was a pupil of Dr. Goddard and Dr. Gabell, who were head masters during his attendance. In 1811 he became a student of Corpus Christi College, Oxford, where he took a degree in 1814, and in 1815 was elected fellow of Oriel College. He was ordained deacon in 1818, and subsequently instructed young men at Laleham. In 1827 he became head master at Rugby, which position he held nearly fourteen years. In a recommendation it was said of him, "If elected, he would change the face of education all through the public schools of England." This prediction of the great man was fully realized, since his work at Rugby was of a very high character. He made this school a great reputation, and himself a warm place in the heart of all the world. "Arnold of Rugby" is known to all English people, and is especially impressed on the minds of all the teachers. His chief aim in teaching was to develop character, which he sought to do by placing trust in his pupils and impressing them through his strong personality. The story of his life is told in the work of Dean Stanley, entitled "The Life and Correspondence of Arnold," and in Thomas Hughes's "Tom Brown's School Days at Rugby." His chief writings include "The History of Rome," "Thucydides," "Fragments Upon the Church," and "The Study of History." His life work practically ended at Rugby, since he died shortly after his election as professor of history at Oxford.

AROMA (ȧ-rō'mȧ), a term employed to designate the constituents of substances that possess minute particles which affect the organs of smell and produce fragrant odors. These odors are diffused without a perceptible loss of bulk or weight of the substances producing them. Among the chief aromatic substances are cloves, vanilla, coffee, and lavender.

AROMATICS (ăr-ō-măt'ĭks), the medicines or drugs that owe their properties to the essential oils, and which are secured from the plants that yield camphor, odorous resins, or essences. Many have a warm, pungent taste, as pepper, ginger, cinnamon, saffron, and nutmeg. Some have a bitter taste, as tansy and wormwood, while others are highly fragrant, as myrrh, musk, and storax. In the United States medicines are usually associated with aromatics, but in some countries they are added only on prescription.

ARPAD (är'päd), the national hero of the Magyars, born in Hungary about 869; died in 907. He engaged in a military life at an early age, succeeding his father, Almos, in an important command, and carried on successful warfare against the Bulgarians, Moravians, and Wallachians. Subsequently he made several raids into Italy. Arpad is the founder of a dynasty which assumed royal dignity in 1000, and became extinct in the male line with Andrew III., in 1301. His name still lives in the songs of Hungary.

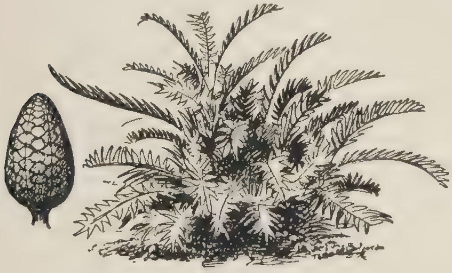
ARRAH (är'rä), a city of India, in the presidency of Bengal, 33 miles west of Patna. The surrounding country is fertile. It is important as a railroad and commercial center. In 1857 it was the scene of a battle in which the British gained a decisive victory over 3,000 Sepoy insurgents. Population, 1923, 51,500.

ARRAN (ă'ran), an island of Scotland in the Firth of Clyde, about 13 miles west of Ayrshire. It is a narrow strip of land, about 20 miles long, and has an area of 165 square miles. The surface is mountainous, culminating in Goatfell, which has an elevation of 2,860 feet above the sea. The island is remarkable because of its numerous strata of rock, including trap, limestone, mica, granite, and sandstone. Population, 4,950.

ARRAS (är-räs'), a city in France, capital of the Department of Pas-de-Calais, 100 miles north of Paris. It has manufactures of lace, hosiery, and cotton goods, and carries a large trade in cereals and live stock. The public library has about 36,000 volumes. In the Middle Ages the city had extensive manufactures of tapestry, and its name has been given to a grade of highly figured hangings. Population, 1921, 20,697.

ARROW (ăr′rō), a missile weapon to be shot with a bow, the latter being bent for that purpose into an angular form. Arrows are usually straight and sharply pointed, and, to inflict a more deadly wound and prevent them being easily pulled out, are often barbed and poisoned at the point. The arrow is frequently mentioned in the Bible as a weapon used in war, and is still employed by savage people. Arrowheads of flint stone were made by the American Indians, many of which are still found in different parts of the continent.

ARROWROOT (ăr′rō-rōōt), the name of a variety of starch derived from the roots and grains of several plants and used as an article of food. The best quality is secured from the roots of a plant cultivated in tropical countries, especially in the West Indies. The roots of this plant are about twelve inches long and nearly an inch thick. They are peeled and ground into a pulp, from which the starch is taken by means of bathing in water, and it is then spread out and dried in the sun. In Brazil a class of arrowroot known as tapioca meal is secured in great quantities from the roots of several plants, and a fine quality is made from Indian corn, known in the market as Oswego arrowroot.



ARROWROOT.

ARRU (ä′rōō), the name of a group of islands in the Arafura Sea, southwest of New Guinea. The group consists of a number of small islands. The surface is low and the area is about 3,000 square miles. Some of the natives have adopted Christianity. Dobo is the chief town. It is a market for pearls, trepang, and edible birds' nests, which are exported. The islands belong to Holland and have a population of 15,000.

ARSENAL (är′sē-nal), an establishment for the manufacture and repair of munitions of war. In most instances separate arsenals are maintained for the manufacture of guns, though formerly all the munitions of war, including explosives and cartridges, were made in general establishments. Great naval arsenals are maintained at Venice, Toulon, and Cherbourg, at which ships are built, repaired, and fitted out. The royal arsenal at Woolwich was established by England in 1720. It comprises a laboratory, and manufactures warlike implements for the army and navy. In the United States each State has an armory for storing arms and ammunition. Large arsenals are located at Fort Monroe, Va., Rock Island, Ill., San Antonio, Tex., and Benicia, Cal.

ARSENIC (är′sē-nĭk), a chemical element found widely distributed in nature, closely resembling a metal in physical properties, but ranking with the nonmetals. Pure arsenic is a shining, steel-gray, hard, and brittle substance. The white powder known as arsenic in the market is an oxide, and is secured largely from vapors that rise in extracting pure arsenic from the ore. Arsenic is a deadly poison, and when taken into the system causes cramps and a burning pain. The workmen who engage in the manufacture of arsenic, or products in which it is used extensively, are very liable to become unhealthy unless the best possible sanitary regulations are observed. Arsenic is found chiefly in Germany, Chile, Mexico, New Zealand, and in the northern section of the Appalachian Mountains, especially in New Hampshire. It is used in medicine and in the manufacture of shot, glass, and other products. When mixed with copper, it produces a beautiful green color, which is used extensively for coloring wall paper. See **Poisons.**

ARSON (är′s'n), the willful and malicious burning of a dwelling or outbuilding belonging to another. The crime of arson includes willfully setting fire to any barn, ship, church, produce, coal mine, or other valuable property. Arson is punishable by common law as a felony, and when death results from it the offender may be punished by inflicting capital punishment, or its legal equivalent. An attempt to set on fire valuable property of another is also punishable as a penal offense. In case the offender sets fire to property for the purpose of defrauding an insurer, the penalty is usually increased.

ART (ärt), the principles of artistic construction and aesthetic criticism, or the application of such principles to artistic works. In an extended sense the word implies everything which may be distinguished from nature. Art and nature are the two most comprehensive subjects of human study. In Pope's familiar expression, "Blest with each grace of nature and of art," is included everything that exists independent of our study and all that can be added by human exertion to render beautiful, appropriate, and pleasing. The term is commonly used to designate skill in performing some specified kind of work, either physical or mental. Usually the several arts are arranged in two groups: the mechanical and the liberal or fine arts. The former engage workmen who successfully follow an occupation in which genius is not the most material element, but rather skill and facility to work with an efficiency imparted by long practice, as the arts of the watchmaker, carpenter, blacksmith, and others. These are usually called the trades. Liberal or fine arts are such as require, not only manual skill, but great genius. These include sculpture, painting, music, architecture, and all that minister to the sentiment of taste by means of the beautiful in color, form, rhythm, or harmony.

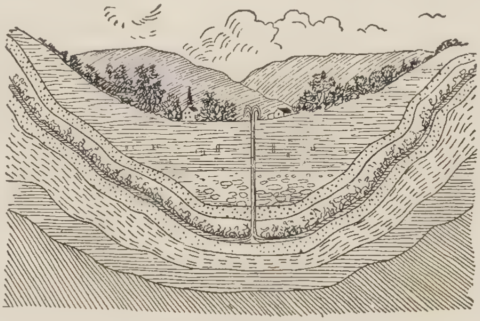
ARTAXERXES (är-tăks-ērks'ēz), meaning *The Mighty*, the name of three Persian kings. Artaxerxes, surnamed *Longimanus*, third son of Xerxes I., ascended the throne in 465 B. C. He conquered the Egyptians and subjected the Athenians. His reign extended over a period of forty years. Artaxerxes, surnamed *Mnemon*, son of Darius II., became king in 405 B. C. After an extended war against the Spartans, he forced them to abandon the cities they had conquered in Greece. Artaxerxes, surnamed *Ochus*, ascended the throne in 359 B. C. During his reign the Phoenicians and Egyptians became subject to Persia. He was poisoned by his eunuch Bagoas in 338 B. C.

ARTEMIS (är'tê-mĭs), an ancient Grecian divinity identified with Diana. See **Diana.**

ARTEMUS WARD, the *nom de plume* of Charles Farrar Browne, humorist, born at Waterford, Me., April 26, 1834; died at Southampton, England, March 6, 1867. He was first a printer and later served as editor of several newspapers in Ohio, where he wrote humorous letters that became very popular. He went to England in 1862, where he lectured and contributed to *Punch*, but afterward again lectured in the United States. His *nom de plume* was signed to articles pretending to have been written by a showman, and these were particularly popular for their droll and eccentric construction. Numerous writers have since imitated his style.

ARTERY (är'tēr-ÿ), the name of any one of the vessels through which the blood is conveyed from the heart to the different parts of the system. These organs are so named because the ancients found that the arteries of dead bodies contained air, and supposed them to be air tubes leading through the body. The arterial system starts from the left ventricle, where it consists of one trunk, called the *aorta*. From it several branches pass to the head, after which it makes a bold curve, known as the *arch of the aorta*, and sends numerous branches to all parts of the lower extremities. Arteries are tubelike canals, by which the pure blood is carried from the heart to the cells. They are nearly straight and are located as near the bones as possible, so as to be less liable to injury. In composition they are elastic, which causes them to yield to every pulse of the heart. They are made up of three layers or coats, including the external or cellular, the middle or fibrous, and the internal or serous, and are encased in a sheath. Where they penetrate muscles, they are often protected by fibrous rings to prevent compression by muscular action. A large canal, not a part of the general arterial system, carries the impure blood from the heart to the lungs to be purified. It is called the pulmonary artery.

ARTESIAN WELL (är-tē'zhan), a boring in the ground through which currents of water rise from various depths toward or above the surface. The possibilty of securing a flow of water in this way depends upon the geological structure, though water is found more or less abundantly in all rock formations. Soil and rock constituted largely of sand contain pores and cavities that easily fill with water, which flows out in case a well is sunk to a depth below the regular cavities in which the liquid is stored. Nearly one-third of the apparent sand mass at the seashore or near water beds is made up of water. Artesians wells are sunk in comparatively low places, and in districts where the lower or older strata are formed into basin-shaped curves. Rain falling on the outer portion of the strata saturates the whole porous bed, and, when the bore reaches below the common water surface, the water rushes up toward the level by hydraulic pressure, the height of the flow being equal to the height of the water in the basin-shaped strata. Wells with a good supply of water can be obtained in nearly all parts of Canada and the United States, but artesian wells are not so common. However, in many localities where holes have been sunk in prospecting for coal, salt brine, gas, petroleum, and other minerals excellent flows of water have been found.


ARTESIAN WELL.

In the eastern part of the United States, particularly in the manufacturing centers of

New York, Ohio, and Pennsylvania, and in many of the Southern States, such wells are utilized extensively for industrial purposes. In New York City a vast supply of water is secured at a depth of 500 feet; at Saint Louis a well at a depth of 2,250 feet discharges seventy-five gallons of water per minute. At Terre Haute, Ind., are several wells from 1,500 to 2,000 feet deep; and at Columbus, Ohio, a good flow is obtained at a depth of 2,275 feet. New Orleans, La., has several such wells, and many have been obtained in the states on the Pacific coast. These wells supply water for city consumption, manufacturing, and irrigation. In South Dakota and in portions of the Sahara Desert wells have been sunk that yield vast volumes of water for the irrigation of large tracts of arid land. The census returns show that over 10,000 of these wells are used for irrigation purposes in the western half of the United States, of which number about 3,000 are in California. These wells are secured at a depth of from twenty to nearly 3,000 feet.

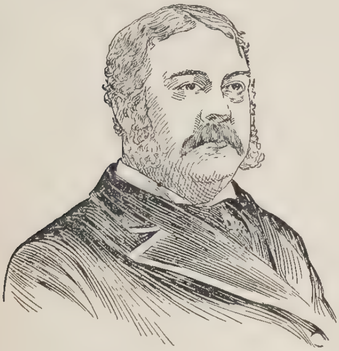
In late years the process of boring wells for oil, gas, and other minerals has become a distinct branch of hydraulic engineering. Usually a hole is bored for some distance, which is cased by driving an iron pipe into it, and this is lengthened from time to time in the process of construction by attaching other sections. Iron piping is used in constructing drill rods, and a valve opening from beneath is attached about every thirty feet. The drill below the rod contains a hole, through which the borings pass, through the agency of a supply of water poured into the well. These borings work upward through the drill rods as they are moved up and down by machinery on the ground above. In this way drilling becomes a process of pumping, which is not only effective in all grades of clays, but is capable of penetrating through the hardest kind of granite. As the drill passes downward into the earth, iron casing is driven down to prevent caving, and additional rods are put in from time to time as the work progresses. In some localities large augers are used a portion of the time, but in most instances the best steel drills are suitable to carry on the work. However, in the harder substances, such as granite and other rock, the diamond drill is used, which is set with black diamond. In making tests for minerals, a careful account is kept of every strata and formation through which the drill passes, by means of which an accurate knowledge of the various deposits is secured and the expense of further improvements can be easily estimated.

ARTEVELDE (är'ta-vĕl-de), **Jacob van,** a brewer of Ghent, celebrated as a Flemish leader in the 14th century. During the war between England and France he supported the English and the Count of Flanders aided the French. He became commander of the forces of Ghent, and gained marked advantages over the nobles. Subsequently he proposed that the son of Edward III. of England be made Count of Flanders. This was unpopular and led to an insurrection in 1345, in which he was slain.—Artevelde, Philip, son of the former, whom he succeeded in 1381 as leader of the people of Ghent. He defeated the Count of Flanders, Louis II., and occupied Burges, but was in power only one year. In 1382 the French took up the cause of the Count of Flanders and defeated him at Rooseboke in a battle, in which he and many thousands were slain.

ARTHROPODA (är-thrŏp'ō-då), or **Articulata,** one of the divisions of the animal kingdom. The body of animals belonging to this family is divided into segments, each of which has a pair of jointed feet or appendages, hence Cuvier named the whole group articulata. Many species have been described, including a class that is parasitic in its habits, and in these some of the organs disappear or lose their functions as the animal grows older. In most species the mouth is upon the lower surface of the anterior end, the seat of the nervous system is above and in front of the mouth, and the heart is dorsal and propels the blood forward, but, as the veins are often lacking, the venous circulation, in some species, is returned to the heart through the tissues of the body. The nerves pass from the brain to the eyes, which are simple in some species and compound in others, and the outer wall of the body is usually hardened by a peculiar substance known as *chitine.* They reproduce exclusively by eggs. The three divisions of articulata are arachnida, crustacea, and antennata. The first mentioned group breathe by lungs, gills, or air tubes; the second by gills entirely; and the last mentioned by air tubes. Those belonging to the antennata are provided with antennae. Among the animals classed in this family are lobsters, spiders, cockroaches, butterflies, mites, flies, bees, etc.

ARTHUR (är'thûr), King of the ancient Britons, who flourished in the 6th century. History assigns him no certain locality, but he is thought to have occupied the regions now called Scotland and to have supported the Christian faith and civil liberty, for which he fought. He established the celebrated Order of the Round Table, and to him are credited the "Chronicles of Geoffrey of Monmouth." Though he reigned but twelve years, he conquered Denmark, Norway, and France. While he was at Rome, his nephew caused his subjects to revolt. Hastening home, he engaged the enemy on the Island of Avalon in a decisive battle and was wounded, from the effects of which he died. Many of the accounts written of him are doubted, but in legend and song he is known by people speaking various languages. Some of the most interesting writings alluding to King Arthur include Caxton's "Byrth, Lyfe, and Acts of Kyng Arthur," Tennyson's "Idylls of the King," and Skene's "Four Ancient Books of Wales."

ARTHUR, Chester Alan, twenty-first President of the United States, born at Fairfield, Vt., Oct. 5, 1830; died in New York City Nov. 18, 1886. His father, William Arthur, D. D., was a Scotch-Irish Protestant who graduated at Belfast College. At the age of eighteen he came to the United States and subsequently was ordained a Baptist minister. Chester received his education at Schenectady, N. Y., and at Union College, at which he graduated in 1848. Soon after graduating he engaged in teaching school, and became principal of an academy at North Pownal, Vt. He saved $500 by teaching and took up the study of law in Lansingburg, N. Y., and was admitted to the bar in 1853. He practiced law and took an active part in politics, in the interest of the Whig party, but became a Republican soon after that party was organized. In 1861 he became quartermaster general in New York City, and the following year was made inspector general. He rendered efficient service throughout the Civil War, especially in preparing the New York troops for the field.


CHESTER A. ARTHUR.

After the close of the war he devoted his time exclusively to the practice of law, being a member of the firm of Arthur, Phelps & Knevals. President Grant appointed him collector of the port of New York, which position he held in 1871-78, and in the latter year he was relieved by President Hayes. In 1880 he advocated the third nomination of Gen. Grant at the national convention in Chicago, and was nominated for the Vice Presidency on the ticket with James A. Garfield. While filling the office of Vice President, he was frequently called on to exercise the right of casting the controlling vote, on account of the Senate being equally divided. He was formally installed in the office of President on Sept. 20, 1881, after the assassination of President Garfield. The exclusion of Chinese immigrants and the abolition of polygamy in Utah were among the important events of his administration. His name was proposed for the nomination for President at the convention in 1884, but that body chose to nominate James G. Blaine. The highest number of votes cast for Arthur was 278 on the first and 276 on the second ballot. His administration was approved by the convention in these words: "In the administration of President Arthur, we recognize a wise, conservative, and patriotic policy, under which the country has been blessed with remarkable prosperity, and we believe his eminent services are entitled to and will receive the hearty approval of every citizen." His death occurred suddenly at his residence. He was buried in Rural Cemetery at Albany, N. Y.

ARTHUR, Julia, actress, born in Hamilton, Ont., May 3, 1869. Her real name, Ida Lewis, was displaced by the maiden name of her mother. She appeared on the professional stage at the age of fourteen years as the *Prince of Wales* in Bandmann's presentation of Richard III. In 1885 she appeared with Irving at the Lyceum Theater in London, and soon after played rôles as *Rosalind* in "As You Like It" and as *Josephine Bonaparte* in "More Than a Queen." She toured Canada and the United States with Irving and Terry in 1896. In 1900 she retired from the stage on account of illness.

ARTHUR'S SEAT, a famous hill near Edinburgh, Scotland, so named from King Arthur. It is 822 feet above the level of the sea, contains many beautiful drives and valuable monuments, and furnishes an excellent view of the city. It has come to be a favorite pleasure resort of Edinburgh, which is frequently called "Modern Athens."

ARTICHOKE (är'tĭ-chōk), a perennial plant resembling the thistle, found native in Europe and Asia. The stem is from two to ten feet high. It is cultivated for food in many parts of Southern Europe. The unripe flower heads and the lower part of the surrounding leaf scales are the chief parts taken for food. The Jerusalem artichoke, a species of sunflower, is cultivated for its root tubers, which resemble potatoes. These may be prepared for the table like potatoes, or eaten raw with vinegar and salt in the form of a salad.

ARTICLE (är'tĭ-k'l), in grammar, one of a class of limiting adjectives, which embrace the adjective elements *a, an,* and *the. A* is used before consonant sounds and *an* before vowel sounds; both are called *indefinite* articles, because they refer to any one of two or more objects. *The* is called the *definite* article.

ARTICLES, The Thirty-Nine, a statement of the points of doctrine agreed upon by the Church of England. These articles, 39 in number, were confirmed by royal authority after having been agreed upon by a convocation held in London in 1562-63. They are articles of religion, a formula, rather than a creed, and originally were 42 in number. A convocation of the Irish Church adopted them in 1635, and they were ratified by the Scottish Episcopal Church in 1804. The General Conference in 1801 made them applicable to the American Episcopal Church, but inaugurated a few slight changes. Formerly the clergy was required to subscribe to the articles, but now they give assent to them and to the Prayer Book. The Methodist Episcopal Church of America reduced these articles to 25, which is the number now published in its Book of Discipline.

ARTICLES OF CONFEDERATION, an instrument adopted by the thirteen colonies of America for their mutual protection and general government. Congress proposed them in 1776 with the condition that they should not be binding until ratified by all the states. Maryland ratified them on March 1, 1781, the last of the States to grant approval, and Congress convened the next day. The delay on the part of Maryland was due to the fact that it demanded that the states cede their claims to territory in the Northwest Territory to the Federal Government, which was done by all the interested states. The instrument united the colonies under the title *United States of America.* While they did not provide a satisfactory plan for government, they remained in force as the fundamental law until March 4, 1789, when the Constitution became operative and the first Constitutional Congress assembled.

ARTIFICIAL ICE (är-tĭ-fĭsh'al). See **Ice.**

ARTIFICIAL LIMBS, the mechanical contrivances employed to fill the functions of a lost limb or part thereof. The construction of artificial limbs possessing considerable merit dates from the beginning of the 19th century, although Herodotus and others mention their use in early history. A Roman artificial leg discovered in a tomb in Capua, and which was used about 300 B. C., is now in the London Royal College of Surgeons. The German Knight, Gotz von Berlichingen, in 1504, wore an iron hand constructed to grasp a sword, which weighed three pounds. Many other remarkable incidents in history may be cited as evidence that artificial limbs have been worn for many ages.

Artificial limbs of recent manufacture possess many points of utility and show much skill in construction. Various kinds of substances are used in the manufacture, but mostly such as possess lightness, strength, and noncorrosive qualities. Aluminum possesses all these elements and has gone largely into the manufacture of these appliances. Arms are often contrived so the hand may be unscrewed and a hair brush, knife, fork, or some similar instruments can be put in its place. Cork, rubber, and wood with leather bands have gone largely into the manufacture of devices to replace lost limbs. Artificial fingers, ears, and noses are skillfully shaped from papier mache. This material may be waxed and varnished so as to have in effect the same complexion as the real organs of the individual. Such an artificial part, if carefully made, cannot be distinguished from the real, except by the very closest examination. Glass is used in the manufacture of artificial eyes, which are so skillfully made that they agree in size, measurement, color, and other essentials with the real eye. They serve a useful purpose in preserving the natural appearance, especially where the wearer still possesses one of the natural eyes.

ARTILLERY (är-tĭl'lẽr-ȳ), the term formerly used to designate any instrument of war, even bows, slings, and arrows, but now applied to cannon and general ordnance, including guns, mortars, howitzers, and machine guns. It is also applied to officers and men of the army to whom the care and management of the artillery is intrusted. It may be taken for granted that the history of artillery proper commenced with the discovery of gunpowder. The first large implements of war to throw missiles of considerable size were constructed of stone. The scientific casting of cannon did not begin until the 17th century, but there is evidence that implements of rough construction were used as early as the 12th century.

With the advent of field guns came the necessity of employing a special body of men skilled in the management of heavy masses of field artillery, though this branch of warfare received little attention until the beginning of the last century. Early experiences showed the large cannon to be unwieldy and it was often lost by mismanagement or rendered of small effect for want of means to move it about. Besides, there was a want of men skilled in the arts of taking aim and calculating distances and the range of guns, whereby effective results might follow. This led to the establishment of artillery schools, where men might be trained to efficiency and skill. These schools date from 1675, when Louis XIV. founded such an institution and organized a special artillery force. France and Germany long possessed the best artillerymen and artillery service of the great powers of Europe. They were trained, not only in institutions, but by personal inspection at the seats of war. This was the case in the war between the English and the Boers, in South Africa in 1900, when Germans and French managed largely the artillery of the latter. However, it was demonstrated in the Spanish-American War and the World War that the United States cannot be excelled in military marksmanship.

Woolwich is the seat of the artillery and engineering school of England. However, most countries of Europe separate the school of artillery from that of the engineers. In the

United States the organization of batteries is largely under the direction of the President. In time of peace the mounted artillery organization is small, while in time of war it constitutes a considerable portion of the general army. Recently automobiles displaced horse artillery to some extent. Owing to the late wars in the colonial possessions, garrisoned fortifications have been constructed at which a large portion of the artillery is utilized. To enlarge the skill of the American army and secure expert artillerymen, a school with a suitable course of study and a practical department is maintained at Fort Monroe, Va. The course consists of two years, and is a post-graduate adjunct to the United States Military Academy at West Point, N. Y.

ARTILLERY SCHOOLS, the institutions designed to impart skill in artillery practice. The first was established in France in 1675, which was followed by one in Germany in 1766, and England founded the Royal Military Academy at Woolwich in 1741. The artillery school of the United States is located at Fortress Monroe, Va. It was founded in 1824, and has a course of study covering two years.

ARUNDEL (ăr′ŭn-dĕl), **Thomas**, Archbishop of Canterbury, born at Arundel Castle, England, in 1353; died Feb. 19, 1413. He was made bishop of Ely in 1373, and later was lord high chancellor of England and archbishop of York. In 1396 he became Archbishop of Canterbury, was banished the following year for complication in the insurrection against Richard II., and returned with Henry IV. two years later to be reinstated at Canterbury. He prosecuted the Lollards, the followers of Wiclif, and aided in procuring the act for the burning of heretics. He caused Lord Cobham to be convicted of heresy, though he was not executed until 1417, and opposed translating the Scriptures into the English language.

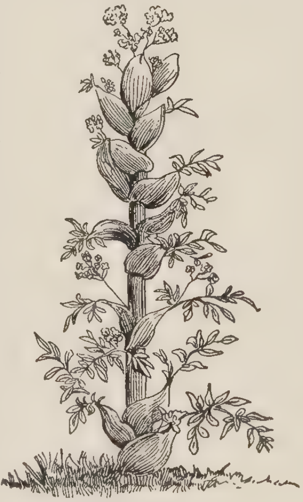
ARUWIMI (ȧ-ro͞o-wē′mē̇), a river of Africa, one of the tributaries of the Congo. It rises west of Lake Albert Nyanza and flows westward through a region of dense forest. At Yambuya, to which it is navigable, are a number of rapids. In different parts of its course of about 800 miles it assumes the names of Ituri and Bijerre.

ARYANS (ăr′yans), the name applied to the Indo-European races. The Aryans originally inhabited the region of Asia near the upper Oxus or Amu River. They engaged in farming and stock raising, and were advanced in some of the arts of civilization. Their origin is traced to the Japhetic nations from Japheth, son of Noah, of whom they are held to be descendants. These people spoke one language, the Sanskrit, from which the modern languages spoken by their descendants have originated. Although many of these languages appear to show no affinity, yet upon close examination it is found that all were derived from the same source and had one common origin. The Aryan nations of Asia are the high-caste Hindus and the ancient Persians, while those of Europe include the Greeks, Latins, Slavs, Letts, Celts, and Teutons; the last mentioned include the Germans and Scandinavians. While little is known of the ancient Aryans, it is thought they engaged chiefly in tilling the soil and in pasturing their flocks. They lived in villages, practiced the grinding of grain and weaving of cloth, and possessed well-formed ideas of government. The English are a branch of the Aryan race, and descended from them through the German people.

AS (ăs), or **Libra**, a Roman weight, divided into 12 *unciae*, and nearly equal to the English pound. A Roman coin called *as* originally weighed a pound, but it was afterward reduced in size and weighed one thirty-sixth of a pound. The older coins bore the figure of some domestic animal, as an ox or a sheep, and on one side of those of more recent date was stamped the head of an important personage.

ASA (ā′sȧ), the son of Abijah, great-grandson of Solomon, and third King of Judah. He reigned from 917 until 876 B. C., and was succeeded by Jehoshaphat. During the early part of his reign the altars of idols were destroyed and their images were broken.

ASAFETIDA (ăs-ȧ-fĕt′ĭ-dȧ), the name of several plants common to Persia and the East Indies. These plants yield a drug useful in medicine, especially for asthma, hysteria, worms, and gaseous distentions of the intestines. To secure the drug old plants are tapped for their juice, which is dried in the sun and hardened, in which state it is exported largely. This drug has a very disagreeable odor, but is used for seasoning articles of food among some tribes in the East.


ASAFETIDA.

ASAPH (ā′săf), a Levite and psalmist, the leading chorister in the divine service in the time of David. He was the founder of a school of musicians and poets. His students were called "The sons of Asaph." Some writers attribute twelve of the Psalms to him, including i and those numbered from lxxiii to lxxxiii.

ASBESTOS (ăs-bĕs′tŏs), a substance named from its property of not being affected by fire. It is a highly useful mineral of a silky luster, having fibers that in some species are delicate, flexible, and elastic, and in others brittle and stiff. Its chief property is that it will not burn, which renders it highly important as a means of protection against fire in buildings and as a sheath or covering to confine heat to a particular channel. The ancients knew of it and used it in preparing flexible cloth for shrouds to cover dead bodies. Deposits of this mineral are found in various localities of all the grand divisions. It occurs in Montana and Georgia in paying quantities, where it is mined profitably. The quality of the American product is equal to any in the world. At Sall Mountain, a foothill of the Blue Ridge in Georgia, an asbestos ledge has been discovered that is more than 800 feet long, about 250 feet wide, and of great depth. Canada has large deposits of white asbestos, which can be spun into fine thread and woven into yarn and rope. Large quantities of this product are marketed annually and its use is extensive. Electrical supply companies employ it in the manufacture of insulators. It is used extensively in making asbestos cement, quick-setting plasters, fireproof roofing, deadening for walls and floors, sectional covers for steam pipes, refrigerator insulation, and many other useful purposes in manufacturing. It has proved especially beneficial in the manufacture of stage curtains in theaters and for the protection of dead bodies that have been embalmed.

ASBJÖRNSEN (äs-byẽrn'sĕn), **Peter Christen,** naturalist, born in Christiana, Norway, Jan. 15, 1812; died Jan. 6, 1885. He visited Egypt and Asia Minor to study rare specimens of botany, and spent two years at the Academy of Therand, Saxony. In 1856 he was made inspector general of the forests of Norway and for some time had charge of the turf industries. He is the author of many works on botany and folklore. The most important are "Norwegian Folk Tales" and "Norwegian Fairy Tales and Legends."

ASBURY (ăs'ber-ĭ), **Francis,** clergyman, born in Handworth, Eng., Aug. 20, 1745; died at Spottsylvania, Va., March 31, 1816. He was the first bishop of the Methodist Church ordained in America, receiving a salary of $64 per year. He came to America in 1771, labored under the direction of John Wesley, and did much for the Christian cause. On account of expressing sympathy for the colonists, he was arrested and fined, but later was permitted to resume his circuit. Under his efficient services the Methodist Church grew from a membership of 316 to 214,000 communicants.

ASBURY PARK, a town of New Jersey, in Monmouth County, on the Pennsylvania and the Central of New Jersey railroads. It is finely situated on the Atlantic coast, six miles south of Long Branch, and is one of the most famous health and pleasure resorts of the Eastern states. A short distance south is Ocean Grove, from which it is separated by Wesley Lake. It is visited by many thousands of people annually, who are amply accommodated by facilities for entertainment. Population, 1905, 4,526; in 1920, 12,400.

ASCALON (ăs'ka-lŏn), or **Askalon,** an important city of ancient Palestine, situated midway between Gaza and Ashdod, on the Mediterranean Sea, thirty-eight miles southwest of Jerusalem. It is mentioned several times in the poetical books of the Scriptures, but is noted more particularly on account of its history in connection with the Maccabees and the Crusaders. The Christians under Godfrey de Bouillon and Tancred attained a noted victory at Ascalon in 1099, and Baldwin III., King of Jerusalem, also gained a victory here in 1153. It was recaptured by Saladin in 1187, and three years later was destroyed by a joint treaty under the Moslems and Christians. The ancient city contained a number of noted temples and was celebrated for the production of wine in the time of Pliny. On the site of the ancient city are ruins and a small village of Turks and Christians.

ASCENSION (ăs-sĕn'shŭn), an island in the Atlantic Ocean, 750 miles northwest of Saint Helena. It has an area of 35 square miles, is of volcanic origin, and belongs to Great Britain. Green Mountain, the highest elevation, rises 2,870 feet above the sea. It is important as a coaling station. Georgetown, the chief business center, is a naval station. Population, 390.

ASCENSION DAY, often called *Holy Thursday,* the day on which the ascension of Christ is commemorated. It has been observed as a feast since about 68 A. D., and is movable, occurring on the second Thursday before Whitsuntide.

ASCHAM (ăs'kam), **Roger,** eminent scholar, born in Yorkshire, England, in 1515; died Dec. 30, 1568. He descended from humble parentage, but was educated with the sons of Sir Anthony Wingfield, and in 1534 graduated from Saint John's College, Oxford. Ascham was a devoted Protestant, became college tutor in 1537, and was appointed teacher of learned languages to Elizabeth, afterward queen, in 1548. It is said that he spent several hours every day reading to her in the learned languages, and that her proficiency was equal to his pains. He was fond of instrumental music and archery. In 1568 he completed his "Schoolmaster," a treatise on the method of teaching Latin to children. His small work on archery, entitled "Toxophilus," was dedicated to Henry VIII., who granted him an annual pension of $50. Queen Elizabeth said in expressing her regrets on account of his death that she would "rather have lost £10,000 than her tutor Ascham." His complete works were published at Oxford in 1703, and Dr. Johnson published his life in 1815.

ASCHBACH (äsh'bäk), **Joseph von,** historian, born near Frankfort on the Main, Germany, April 29, 1801; died April 25, 1882. He was professor at Bonn and Vienna, and for efficient service was ennobled in 1870. His chief works are "History of the Emperor Sigismund," "History of the Visigoths," and "History of the Omeyyades in Spain."

ASH, a genus of forest trees common to North America and Eurasia. More than fifty species have been described, of which the common ash is the most widely distributed. The species native to North America include the red ash, white ash, blue ash, and swamp ash. The ash tree is distinguished by its size and graceful foliage. It attains a height of sixty to ninety feet and has widespreading branches. It yields a good quality of timber for the manufacture of plows, vehicles, furniture, and agricultural implements. The weeping ash is a species with drooping branches, and the mountain ash is planted largely as an ornamental shade tree. A species native to Palestine, the flowering or manna ash, yields the substance called manna. This product exudes from incisions made in the bark. Some varieties yield a sap useful in the preparation of medicine.

ASHANTEE (à-shăn'tē), or **Ashanti,** a country in Western Africa, situated north of the Gulf of Guinea, and extending toward the interior from the Gold Coast. Though its boundaries are not accurately defined, its area is placed at 50,000 square miles, and the population at 3,000,000. It is one of the largest native kingdoms of Africa, but within recent years many changes have been wrought on account of the extension of European interests, particularly those of France, England, and Germany. The country is rich in gold dust and ivory, and there are considerable productions of fruits, cereals, vegetables, and fish. Several wars have been carried on with European powers. The government is a despotic monarchy, in which slavery is still recognized. In 1896 it was placed under British protection and was annexed to that country in 1901. The chief seat of government is at Kumassi, which, in 1922, had a population of 19,500.

ASHBURTON (ăsh'bûr-ton), **Alexander Baring,** diplomat, born in London, England, Oct. 27, 1774; died May 13, 1848. He was employed in mercantile affairs and succeeded his father as head of the firm of Baring Brothers. While in the United States he married a daughter of William Bingham, United States Senator from Pennsylvania. In 1806 he was elected to Parliament and was reëlected several times, and gave support to the policy of Sir Robert Peel. In 1842 he was made commissioner to adjust the rival claims between England and the United States on account of a dispute in regard to the northeastern boundary, and with Daniel Webster negotiated the Ashburton Treaty (q. v.). He was selected as a commissioner in negotiating a settlement because he was inclined to a specific policy.

ASHBURTON TREATY, a treaty negotiated between the United States and Great Britain at Washington in 1842, the former country being represented by Daniel Webster and the latter by Lord Alexander B. Ashburton. By this treaty the northeastern boundary between the United States and Canada was finally settled, the United States securing about seven-twelfths of the territory in dispute. It was also stipulated that the slave trade should be mutually suppressed.

ASHEVILLE (ăsh'vĭl), a city in North Carolina, county seat of Buncombe County, on the French Broad River, 210 miles west of Raleigh, on the Southern Railroad. It is finely situated in the midst of the Blue Ridge Mountains, at an elevation of 2,300 feet, and enjoys a large manufacturing and jobbing trade. The city has well-paved streets, rapid transit, electric lights, and excellent school and church buildings. It is the center of a large jobbing trade throughout the southeastern states. Among the chief buildings are the city hall, the post office, the Auditorium, the Asheville Normal and Collegiate Institute, and the Battery Park Hotel. Richmond Hill, Overlook Park, Pisgah Forest, and the Vanderbilt estate are among the points of interest. It has manufactures of paper, clothing, earthenware, machinery, flour, and furniture. Its favorable location has made Asheville famous as a health resort, both for summer and winter visitors. The region was first settled in 1792. Population, 1900, 14,694; in 1920, 28,504.

ASHLAND (ăsh'land), a city of Boyd County, Kentucky, on the Ohio River, and on the Norfolk and Western and the Chesapeake and Ohio railroads. It is surrounded by a fertile farming country, which contains extensive deposits of coal. The manufactures include ironware, boilers, furniture, nails, and machinery. The city has good municipal improvements, and enjoys the advantages of good school and church facilities. It was first settled in 1854 and became an incorporated city in 1870. Population, 1900, 6,800; in 1920, 11,729.

ASHLAND, the county seat of Ashland County, Ohio, 65 miles southwest of Cleveland, on the Erie and other railroads. It has a large trade in grain and produce. A public library and the county courthouse are among the chief buildings. It has waterworks, electric lights, and manufactories of machinery. Population, 1900, 4,087; in 1920, 9,249.

ASHLAND, a city of Oregon, in Jackson County, fifteen miles southeast of Jacksonville, the county seat. It is on the Southern Pacific Railroad, in a fruit growing country, and granite quarries and gold mines are worked in the surrounding country. Railroad shops, lumber yards, and canning factories, are among the industries. It is the seat of a State normal school. In the vicinity are mineral springs. Population, 1900, 2,634; in 1920, 4,283.

ASHLAND, a borough in Schuylkill County, Pennsylvania, twelve miles northwest of Pottsville, on the Philadelphia and Reading and the Lehigh Valley railroads. It has large foundries and machine shops, and anthracite coal is mined in the vicinity. The State Miners' Hospital is located at this place. It has a municipal system of waterworks and several fine schools. Ashland was incorporated in 1857. Population, 1900, 6,438; in 1920, 6,666.

ASHLAND, a city in Wisconsin, county seat of Ashland County, on Chequamegon Bay, 200 miles north of La Crosse. It is on the Northern Pacific, the Sault Ste. Marie Line, the Chicago and Northwestern, and other railroads, and has a large trade in lumber, iron, and building stone. The manufactures include lumber products, ironware, machinery, furniture, and clothing. Among the chief buildings are the county courthouse, the post office, the North Wisconsin Academy, the Vaughn Public Library, and the Knight Hotel. The city has a fine system of public schools and numerous churches, and is substantially improved by pavements, electric lights, and street railways. There are several fine parks and libraries. It was first settled in 1854 and was chartered as a city in 1887. Population, 1905, 14,519; in 1920, 11,334.

ASHTABULA (ăsh-tȧ-bū'lä), a railroad center and manufacturing city of Ohio, in Ashtabula County, at the mouth of the Ashtabula River, on Lake Erie and the Nickel Plate, the Pennsylvania, the New York Central, and other railroads. The surrounding country is productive, yielding considerable quantities of cereals, live stock, and fruits. The city has a fine harbor on Lake Erie, and direct steamboat connections are maintained with Chicago, Cleveland, and other lake cities. The manufactures include ships, boilers, engines, leather, machinery, furniture, clothing, and tobacco products. It has a fine system of public schools, many well-built churches, and good municipal improvements, including electric street railways, pavements, waterworks, and several fine parks. The first settlement was made in 1803. Population, 1900, 12,949; in 1920, 22,082.

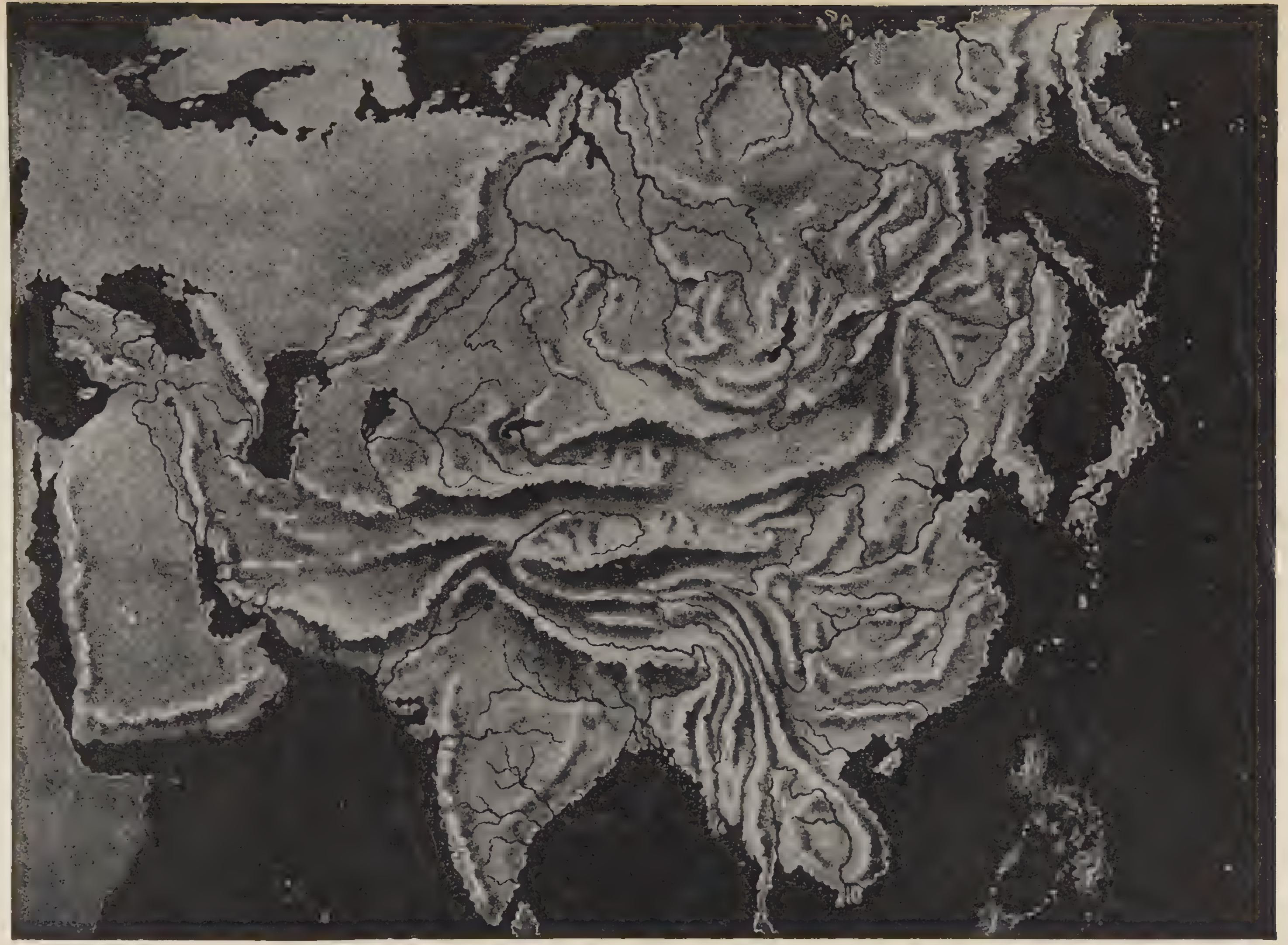
ASHTON-UNDER-LYNE (ăsh'tun ŭn'der līn), a manufacturing town of England, in Lancashire, six miles east of Manchester. It is nicely situated on the Tame River and several railroads, and has large industries in calico printing and the manufacture of machinery. A canal connects it with Manchester and other important towns. It was founded by the Saxons and has a church built in the time of Henry V. Population, 1911, 43,900.

ASH WEDNESDAY, the first day of Lent, so named from the Roman Catholic ceremony of sprinkling ashes on the heads of penitents then admitted to penance. It is thought probable that this custom was established by Gregory the Great. The ashes are secured by burning palms, after which they are consecrated on the altar and sprinkled with holy water, and a small portion is then cast on the head of the penitents as they kneel at the altar.

ASIA (ā'shĭ-ȧ), the largest of the grand divisions, comprising an area of 16,775,000 square miles, about twice the extent of North America. The principal boundaries on the north are formed by the Arctic Ocean, east by the Pacific, south by the Indian, and west by Africa and Europe. As a whole, the coast line is indented by numerous inlets, many of which are deep and expansive seas. On the north are the Kara Sea and the Gulf of Ob. The eastern shore is indented by the gulfs of Anadir, Tartary, Pechili, and Tonkin, and by the Sea of Okhotsk, the Japan Sea, the Whang Hai or Yellow Sea, and the East China Sea. On the south are the gulfs of Siam, Martaban, Cambay, Cutch, and Oman, the Bay of Bengal, the South China Sea, and the Arabian Sea; to the southwest are the Gulf of Aden and the Red Sea; and the western boundary is formed partly by the Mediterranean, the Black Sea, and the Caspian Sea. Few great lakes or inland waters characterize the continent, those of most importance being Lake Baikal, the Aral Sea, and lakes Tenis, Balkash, and Tungting.

The continent is separated from Europe by the Ural Mountains, the Ural River, the Caspian Sea, the Caucasus Range, and the Black Sea. It is connected with Africa by the Isthmus of Suez, through which the Suez Canal has been cut, and it is separated from Africa mainly by the Red Sea and the Gulf of Aden. Near the continent are a large number of islands, especially off the eastern coast, many of which are the peaks of volcanic mountains belonging to systems partly submerged. The East Indies constitute the largest group of islands, and include Borneo, Sumatra, and New Guinea. North of the East Indies are the Philippines, Formosa, and the group included in Japan. North of the continent, in the Arctic Ocean, are Anjou or New Siberia, and a number of small groups not well known. Small islands are located in the seas east and south of the continent, including Hainan in the China Sea, the Andaman islands and Ceylon in the Sea of Bengal, and numerous small groups in the Arabian Sea.

Physical Features. The altitude of Asia is varied to a greater extent than that of any other portions of the earth, ranging from a considerable tract below sea level to the highest mountain summits in the world. A tract of 50,000 square miles in the region of the Caspian Sea is below sea level, while the highest extensive region on earth is included in the lofty highlands of the interior. The Plateau of Pamir is situated about 1,000 miles south-



RELIEF MAP OF ASIA.

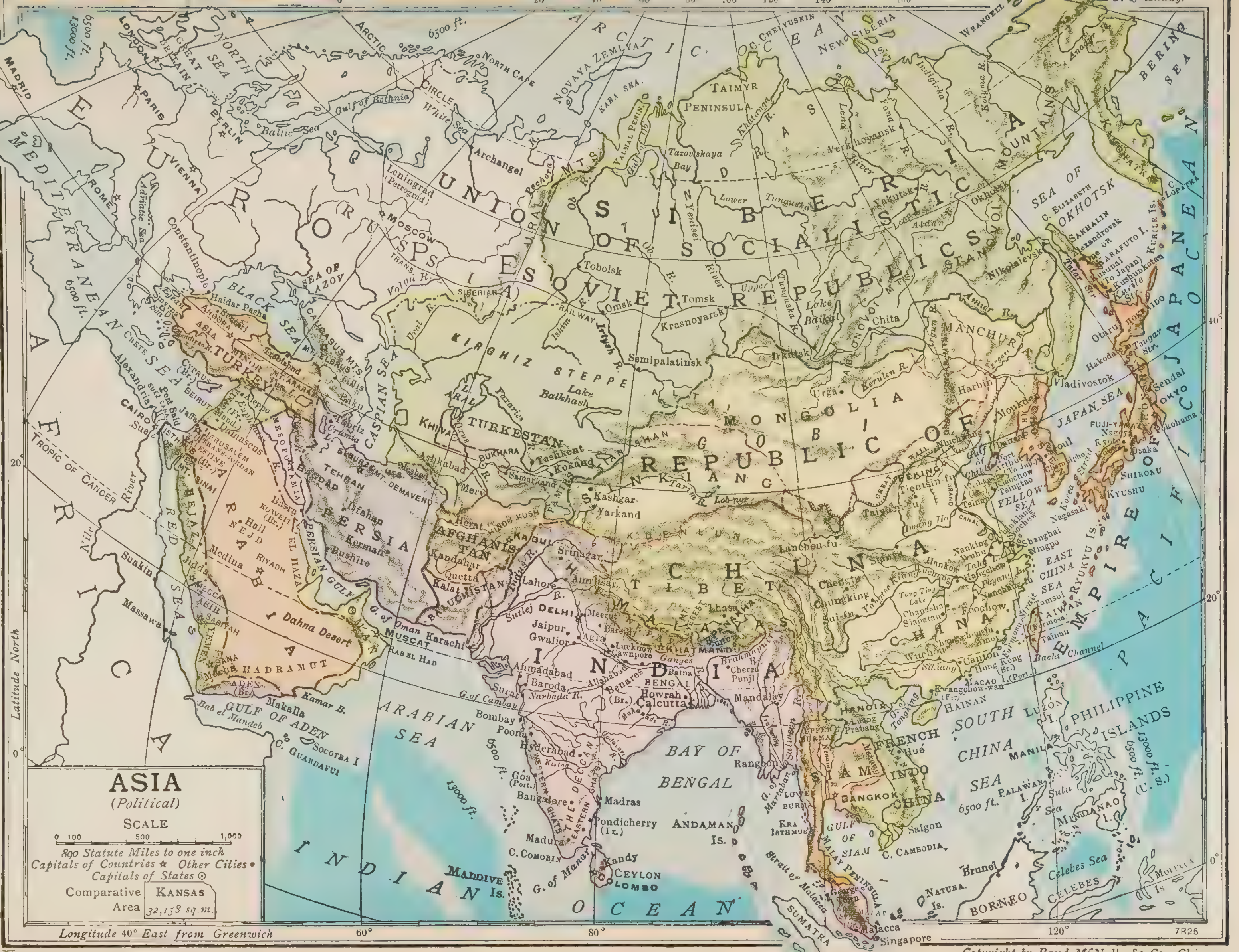
west of the center of the continent, where the boundaries of Afghanistan, India, and Turkestan meet. This plateau is near the center of the mountain systems, which radiate from it in various directions. Southeast of it are the Himalayas; northwest, the Hindu Kush; and northeast, the Thian Shan. East of the Pamirs are the Kuenlun Mountains, which extend east into China, and southwest of them is the Plateau of Tibet. The Hindu Kush attain a height of 25,000 feet and are extended westward by the Elburz in the northern part of Persia, where Mount Demavend has a height of 18,500 feet. South of the Elburz is the great Plateau of Iran, situated mostly in Persia and Afghanistan.

The Himalaya Mountains trend in a slight curve from the northwest to the southeast, forming a natural barrier between India and China, with many chains and groups of mountains both north and south of the central ridge. Mount Everest, the highest peak, has a summit 29,002 above sea level, and, like many others in the continent, is covered perpetually with snow. The Desert of Gobi occupies a large part of Northern China, east of which are the Great Khinghan Mountains, trending north and south, and north of it are the Yablonoi Mountains. Arabia is a tableland, made up largely of the Desert of Roba el-Khali, with a narrow coast bordering on the surrounding waters. The mountains of Armenia culminate in Mount Ararat, famous as the landing place of Noah after the Deluge, and Asia Minor is characterized by the Taurus Range and other mountains. The Deccan, a region elevated about 2,000 feet, stretches over a part of India, and the Altai Mountains extend from Siberia into the northern part of China. Although most of the rivers have their source in the Himalayas, the Hindu Kush, and the Altai mountains, the drainage is practically in all directions from the borders of the Desert of Gobi. Asia contains large tracts that belong to the desert and arid regions, including the Tarim Desert, the Desert of Gobi, the Arabian Desert, and a portion of the Kirghiz Steppe.

RIVERS. The continent has seven great river systems, which include a number of the largest water courses on the globe. Since railroad building has not been developed to a large extent, these water courses remain as important in transportation as they were in remote antiquity. The Tigris and Euphrates discharge into the Persian Gulf; the Ob, the Lena, the Indigirka, and the Yenisei flow into the Arctic Ocean; the Ural flows into the Caspian Sea; the Amur, the Hoang Ho, the Yang-tse-Kiang, and the Si-Kiang flow east into the Pacific; and the Mekong, the Ganges, the Indus, the Irawaddy, and the Brahmaputra carry their drainage south into seas and bays connected with the Indian Ocean. Some of the rivers are inland and have no visible connection with the sea. This class of streams include the Amu Darya and the Sir Darya, flowing into the Aral Sea, and the Ili, which discharges into Lake Balkash.

CLIMATE. In the northern part the climate is cold during most of the year, the extreme northern point, Cape Chelyuskin, being somewhat farther north than Nova Zembla. Here the temperature rises quite high during the short summer season, though the warm portion of the year is only momentary as compared with the long winters, and in a large portion of Northern Siberia, particularly in the Tundra, the ground never thaws out entirely. In the central region the temperature is extremely cold in the winter, and hot in the summer; on the southern slope of the great mountain systems the climate is warm, while along the southern coast it is very hot, though all parts are comparatively healthful. In the southern portion, owing to the equatorial winds, rain falls abundantly about one-half of the year, while the other half is practically rainless. The northern part, owing to the presence of lofty plateaus in the interior, is generally arid. As a whole, the climate is not wet, which is due partly to its vast extent and partly to the absence of a considerable water surface in the interior. The continent has a wide range of temperature, the maximum ranging from 75° on the northern coast to 120° in Persia and Arabia, and the minimum is from about 65° in the southern part to 58° below zero in the northern section. In Northeastern Asia, at Verkhoyansk, the temperature falls as low as 92° below zero. Hot winds from the deserts, oceanic currents, and the monsoons of the Indian Ocean affect the climate to a considerable extent in different sections.

ANIMAL LIFE. The animals of Asia are very numerous and include the largest species of mammals. Tropical Asia has the Asiatic elephant, a species different from the elephant of Africa. The buffalo, rhinoceros, deer, porcupine, squirrel, and many varieties of apes and monkeys are found in the southeastern part. In the highlands of Tibet and the plateaus of the Himalayas the yak is common. This animal is used extensively as a beast of draft and burden. The camel is native to Asia and fills an important function in the industries. Other animals common to different sections are the goat, lion, hyena, and many species of birds and reptiles. The domestic animals, besides those common in America, are the buffalo, Angora goat, camel, elephant, and sacred ox. In Central Asia the mountaineers rear the sheep, horse, goat, and ass extensively, while the camel is almost indispensable in the arid region, and the yak is reared and used chiefly in the highlands and regions having a temperate climate. Fish are abundant off the Asiatic coast and in the interior waters. The dolphin, dugong, crocodile, boa, and cobra de capello are Asiatic animals.


ARCTIC OCEAN
NOVAYA ZEMLYA
KARA SEA
NORTH CAPE
ARCTIC CIRCLE
TAIMYR PENINSULA
C. CHELYUSKIN
NEW SIBERIA IS.
WRANGEL I.
Anadyr
BERING SEA
C. LOPATKA
KAMCHATKA
SEA OF OKHOTSK
C. ELIZABETH
SAKHALIN
Alexandrovsk
KARAFUTO I. (To Japan)
Kushunkotan
KURILE IS.
Tatar Str.
Okhotsk
Nikolaievsk
STANOVOI MTS.
Aldan R.
Yakutsk
Verkhoyansk
Yana R.
Indigirka R.
Kolyma R.
Lena River
Khatanga R.
Tazovskaya Bay
Yalmal Penin.
Gulf of Ob
Lower Tunguska
Upper Tunguska R.
Yenisei River
Ob R.
Tobolsk
Omsk
Tomsk
Krasnoyarsk
Irkutsk
Lake Baikal
Chita
YABLONOVOI MTS.
URAL MTS.
Pechora
Archangel
White Sea
Leningrad (Petrograd)
MOSCOW
Volga R.
TRANS SIBERIAN RAILWAY
Irtysh R.
Ishim R.
Semipalatinsk
UNION OF SOCIALIST SOVIET REPUBLICS
SIBERIA
RUSSIA
EUROPE
GREAT BRITAIN
LONDON
NORTH SEA
Gulf of Bothnia
Baltic Sea
BERLIN
PARIS
MADRID
VIENNA
ROME
Adriatic Sea
MEDITERRANEAN SEA
CRETE
Constantinople
BLACK SEA
SEA OF AZOV
CAUCASUS MTS.
MT. ELBRUS
Tiflis
Baku
CASPIAN SEA
Ural R.
KIRGHIZ STEPPE
Lake Balkhash
ARAL L.
Yazarta
TURKESTAN
KHIVA
BUKHARA
Tashkent
Kokand
Samarkand
Ashkabad
Meshed
Merv
PAMIR
Haidar Pasha
ANGORA
Smyrna
ASIA MINOR
TURKEY
Trebizond
MT. ARARAT
Aleppo
Euphrates R.
Cyprus (Br.)
BEIRUT
Damascus
Jaffa
JERUSALEM
PALESTINE (Br.)
TRANS-JORDAN
Port Said
SUEZ CANAL
ISTHMUS OF SUEZ
Alexandria
CAIRO
Suez
MT. SINAI
MESOPOTAMIA
BAGDAD
Basra
KOWEIT (Br.)
Tabriz
Urumia L.
TEHRAN
ELBURZ MTS.
MT. DEMAVEND
Isfahan
PERSIA
Kerman
Bushire
PERSIAN GULF
EL HAZA
NEJD
Hail
RIYADH
Medina
ARABIA
HEJAZ
Jidda
MECCA
ASIR
SABYAH
YEMEN
SANA
Mocha
ADEN (Br.)
HADRAMUT
Dahna Desert
OMAN
MUSCAT
G. of Oman
RAS EL HAD
Makalla
Kamar B.
Bab el Mandeb
GULF OF ADEN
SOCOTRA I.
C. GUARDAFUI
RED SEA
Suakin
Massawa
Nile River
TROPIC OF CANCER
AFRICA
Herat
HINDU KUSH
KABUL
AFGHANISTAN
Kandahar
Quetta
Kalat
BALUCHISTAN
Karachi
Indus R.
Srinagar
Lahore
Amritsar
Sutlej
DELHI
Meerut
Bareilly
Agra
Jaipur
Gwalior
Lucknow
Cawnpore
Ganges
Allahabad
Benares
Patna
BENGAL
Howrah
Calcutta
(Br.)
Ahmadabad
Baroda
Narbada R.
Surat
G. of Cambay
Bombay
Poona
Mahanadi R.
Godavari R.
Hyderabad
Kistna
Goa (Port.)
Bangalore
WESTERN GHATS
THE DECCAN
EASTERN GHATS
Madras
Pondicherry (Fr.)
Madura
C. COMORIN
G. of Manar
Kandy
CEYLON
COLOMBO
MALDIVE IS.
INDIA
ARABIAN SEA
6500 ft.
13000 ft.
INDIAN OCEAN
BAY OF BENGAL
ANDAMAN IS.
KHATMANDU
NEPAL
HIMALAYAS
MT. EVEREST
Lhasa
Brahmaputra R.
Cherra Punji
Mandalay
Irrawaddy R.
Rangoon
UPPER BURMA
LOWER BURMA
G. of Martaban
Salween R.
KRA ISTHMUS
TIBET
KUEN LUN
Kashgar
Yarkand
Tarim R.
Lob-nor
SINKIANG
THIAN SHAN
ALTAI
MONGOLIA
GOBI
Urga
Kerulen R.
REPUBLIC OF CHINA
CHINA
Lanchow-fu
Sianfu
Chengtu
Chungking
Sui-fu
Yangtze Kiang
Hankow
Wuchang
Tung Ting Lake
Changsha
Siangtan
Hwang Ho
Taiyuan-fu
GREAT WALL
PEKING
Tientsin-fu
GRAND CANAL
Tsinan
Tsingtao
Kiaochow
Port Arthur (To Jap.)
Dairen
Gulf of Chihli
Niuchwang
Harbin
Mukden
MANCHURIA
Amur R.
Sungari R.
Argun R.
Vladivostok
Nanking
Wuhu
Tahu L.
Hangchow
Poyang L.
Nanchang-fu
Shanghai
Ningpo
Chinkiang
Soochow
Foochow
Amoy
Swatow
Canton
Hong Kong (Br.)
MACAO I. (Port.)
Si Kiang
Wuchow
Kwangchow-wan (Fr.)
HAINAN
G. of Tongking
HANOI
Luang Prabang
Mekong
FRENCH INDO CHINA
Hué
Saigon
C. CAMBODIA
SIAM
BANGKOK
GULF OF SIAM
MALAY PENINSULA
Strait of Malacca
Georgetown
Malacca
Singapore
SUMATRA
NATUNA IS.
BORNEO
Brunei
CELEBES
Celebes Sea
MOLUCCA IS.
MINDANAO I.
Sulu Sea
PALAWAN I.
MANILA
LUZON I.
PHILIPPINE ISLANDS (U. S.)
SOUTH CHINA SEA
FORMOSA
TAIWAN
Tainan
Tamsui
Bashi Channel
EAST CHINA SEA
YELLOW SEA
KOREA
Seoul
Chemulpho
Fusan
Korea Strait
Nagasaki
KYUSHU
SHIKOKU
Osaka
Kyoto
Nagoya
FUJI-YAMA
TOKYO
Yokohama
Sendai
Hakodate
Tsugar Str.
Otaru
HOKKAIDO
JAPAN SEA
RYUKYU IS.
JAPANESE EMPIRE
PACIFIC OCEAN
Latitude North
0°
20°
40°
60°
80°
120°
7R25

ASIA

(Political)

SCALE

0 100 500 1,000

800 Statute Miles to one inch

Capitals of Countries ★ Other Cities •

Capitals of States ⊙

Comparative Area KANSAS 82,158 sq. m.

Longitude 40° East from Greenwich

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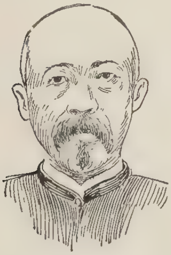
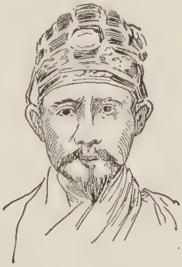
PLANTS. Many species of plants abound that are common to the same latitudes in Europe, but the variety is greater than the plants classed in the flora of that grand division. Some of the deserts are barren and almost destitute of vegetation, but they are bordered by vast areas of pasture land, and where the climate is sufficiently moist and the temperature favorable plant life thrives luxuriantly. In the north are vast forests in which the willows, pines, and birches predominate. Maples, oaks, poplars, walnuts, limes, and the mulberry are found in Japan, China, and the regions having a similar climate. Aromatic shrubs abound in Persia and Arabia and in most of the southern sections thrive the date palm, the banyan, the mahogany, the magnolia, and the gum-producing acacias. A large variety of the cultivated plants of Europe are common to Asia and have been cultivated for many centuries. The chief economic plants are rice, maize, wheat, oats, barley, tea, sugar cane, cotton, tobacco, buckwheat, millet, potatoes, and rye. Fruits are cultivated on a large scale for the market in the south, especially the banana, yam, plantain, and raisin grapes. Spices, pepper, and the opium poppy are grown extensively.

MINERALS. The minerals are very abundant, but mining has not been developed as extensively as in Europe and America. Petroleum and mineral oil abound in many places, especially in parts of India and in the vicinity of the Caspian Sea. Coal is mined in Siberia, Eastern China, and India, and salt and saltpeter are abundant in Persia and Asia Minor. Limestone, sandstone, and granite are quarried for building purposes, and beds of gypsum have been developed and are used in the manufacture of Portland cement. Other minerals more or less predominant are silver, gold, manganese, copper, lead, iron ore, and precious stones, including rubies, diamonds, and sapphires.

INHABITANTS. The people of Asia are greatly diversified, and at least five races or divisions are well represented. These include the Mongolian in the eastern and central parts, the Caucasian in the western part and India, the Malay in the Moluccas and the Indian Archipelago, the Drividas in southeastern India and Ceylon, and the Papuans and Negritos in the Philippine Islands. With respect to society the people of Asia are largely diversified from the lowest savage state to the higher civilizations. Within the last few decades the Mongolian race, which in numbers greatly exceeds all others, has been influenced materially by the education and political advancement of Europe, especially the Japanese, who have reformed their government in a large measure and reorganized their educational system to conform to the needs of an advancing civilization. The spirit of progress has influenced to a considerable extent the people of China, India, and some sections of Western Asia, but the stationary condition that has prevailed among the Malayans remains the same. Mohammedanism, Brahmanism, Buddhism, and Confucianism are the chief religions in numerical strength, but the Christians and Jews are quite well represented. In 1921 the population was 894,409,856; hence more than half of the human race live in Asia.



CHINESE.



THIBETAN.

GOVERNMENT. The systems of government differ widely and have been influenced more or less noticeably by the people of Europe and America. A considerable area is at present controlled or governed by nations that are not Asiatic in location or racial affiliation. The independent countries are Japan, Persia, Asiatic Turkey, China and its dependencies (Eastern Turkestan, Mongolia, Tibet, Sungaria, and Manchuria), and portions of Arabia. Corea belongs to Japan and Afghanistan and Baluchistan are under the control of Great Britain.

Russia possesses the largest scope of territory which is under the government of nations not located in Asia. The Russian possessions comprise Turkestan, Siberia, and Transcaucasia, and embrace an area of 6,390,000 square miles. The British possessions, comprising about 1,800,000 square miles, include Ceylon, India, and the Straits Settlements. France has territory equal to 25,000 square miles, confined to the peninsula known as Indo China, which embraces Cambodia, Oman, Tonkin, and Cochin China. The Philippine Islands are territory of the United States and the larger part of the East Indies belongs to the Netherlands. Germany had leased Kiauchau from China and occupied the Caroline Islands, which were captured by Japan in 1914. Portugal has a small possession in India.

The great diversity of races, languages, customs, and religions has given rise to varied economic conditions. Until recently there were no telegraph and telephone lines, and railroads were unknown. With the growth of European influence and the consequent reforms in government and methods of commerce, wonderful changes have been wrought. Russia constructed and operates the great transcontinental railroad, a continuous line from Saint Petersburg, across the northern portion of Eurasia, to Vladivostok on the Sea of Japan. India alone possesses 30,000 miles of railroads, and several trunk systems and many shorter steam and electric lines have been built in the Philippines, Japan, Turkey, and Turkestan. Many of the seaport cities have extensive and well improved harbors, but the foreign trade is handled largely by European vessels. Numerous telegraph and telephone lines have been constructed and modern municipal facilities have been introduced into the larger cities.

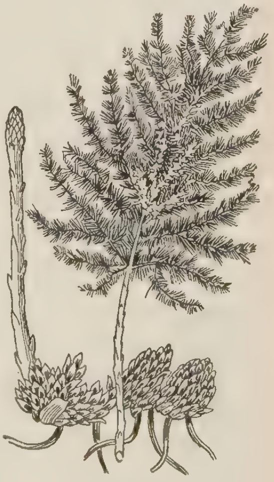
History. The history of Asia is recounted in the oldest historical documents, and that continent is generally regarded the cradle of the human race. In Genesis is an account dating back to a period about 1,600 years before the Christian era, in which Moses details the biblical history of the creation of man, and gives a recital of the facts relating to the Deluge and to the establishment of the Mosaic code. Western Asia contains antiquities quite as old as those of Egypt, while authentic history in China is traced to a period fully 1,000 years before the Christian era. These early dates are more or less associated with the kingdoms of Egypt, Assyria, Media, Babylon, Persia, and Phoenicia. Not only do we trace the early seat of the Aryan race to the vicinity of the Amu or Oxus River, but we find in Asia the origin of practically all popular religions, including the Jewish, Christian, and Mohammedan. From Asia vast populations moved westward over Europe, distributing themselves more or less from the Caspian Sea to the British Isles, but in the long period of the Middle Ages little was known of the original seat of mankind.

With the modern rise of European civilization, and the spread of Christianity and education, we are brought in closer contact with the people of Asia. The natural desire to learn as much as possible of former development in the arts and sciences induced the scholars of modern times to explore the ruins of former states and the seat of ancient civilizations. With the invention of the steamboat came a new era of navigation and large armies were transported to the continent with the view of extending the trade of the leading nations of Europe. Although unwilling to coöperate in the new order of things, the native races were unable to prevail against the improved implements of war and the superior discipline of the armies with which they were confronted. Thus, we find practically all parts of Asia overrun with Europeans in the eager strife for political and industrial advantage. This impetus of the newer and larger commercial life, though opposed by the native races, is developing the mines and forests as well as building up the higher educational arts. For further information, see special articles on the different countries, especially subheads *History* and *Description*.

ASIA MINOR, a peninsula at the western extremity of Asia, situated between the Black Sea and the Mediterranean, and forming a part of Asiatic Turkey. The area is about 220,000 square miles. The surface is an elevated plateau, with a narrow coast on the bordering seas. Among the chief mountain ranges are the Taurus and the Anti-Taurus, between which are extensive and fertile valleys. There are many lakes, some of which are salt, but only few rivers of importance are within the region. The chief drainage is into the Black Sea by the Sakaria and the Kizil Irmak rivers, and by the Meander into the Grecian Archipelago, or Aeagean Sea. Most of the inhabitants are Turks, though there are a variety of races, and the total population is about 7,000,000.

The region included in Asia Minor was once the seat of many great cities linked closely with history. Anciently it was divided into Ionia, Lydia, Phrygia, Galatia, Caria, Bithynia, Pontus, Mysia, Paphlagonia, Lycia, Pisidia, Cilicia, Isauria, Cappadocia, and Pamphylia. Among its chief cities were Smyrna, Ephesus, and Troy, and there were fought some of the most renowned battles of the world. The coast regions and many valleys are fertile and are cultivated. Though the interior is arid, it yields nutritive grasses. Cereals, fruit, wine, minerals, timber, and domestic animals are the chief products. Angora, Smyrna, Scutari, and Erzerum are among the present cities of Asia Minor.

ASP (ȧsp), a species of snake native to Egypt and Libya, and distinguished for its venomous bite. It became well known in ancient times by the circumstance that Cleopatra chose the bite of an asp to accomplish her suicide. This species is quite similar to the cobra found in various parts of Arabia, but differs from it in having a narrower neck and some slight differences in color. The bite produces acute pain in the first instance, and the poison is said to act so quickly that the application of an antidote is impossible. The Bible makes mention of the asp in Romans iii, 13.



ASPARAGUS.

ASPARAGUS (ăs-păr'ȧ-gŭs), a perennial plant of the lily family, largely developed by cultivation, and now grown as an article of food. It is propagated in beds heavily mulched, the young shoots being the only portions eaten. These boiled and enriched with butter and seasoning are nutritious and healthful. This plant was extensively cultivated by the Greeks and Romans, but is found in a wild state in the warmer parts of Europe and Asia. It is grown extensively for market in the United States. The best yield of young shoots is obtained from plants at least three years old.

ASPASIA (ăs-pā'shĭ-ȧ), a woman of ancient Greece, daughter of Axiochus, and noted for her genius and political influence. She was born at Miletus and removed to Athens, where she married Pericles, and became the mother of a son also named Pericles. Her husband divorced his first wife to marry her, but since she was a foreign woman the marriage was not considered legitimate and was later legitimated by special decree. In 429 B. C., after the death of Pericles, she lived with Lysicles. She is reputed of great talent and some writers credit her with having composed part of the funeral oration pronounced by Pericles over the Athenians who fell in battle about 430 B. C.

ASPEN (ăs'pĕn), a species of poplar sometimes called trembling poplar on account of the highly tremulous motion of the leaves. It is native to the mountainous regions of both Europe and Asia. The wood is light, soft, white, and smooth, and is used chiefly to make troughs, pails, trays, and arrows. The tree usually is slender and rootstalks spring in large numbers at a considerable distance from the main stem. This species of tree is planted largely for ornament, but in many regions, as in the Mississippi valley, the tops die when the rootstalks begin to spring from the roots.

ASPHALT (ăs'fălt), a mineral pitch, so called from the name applied by the Greeks to the Dead Sea, where it was anciently obtained in considerable quantities. It is probably composed of decayed animal and vegetable substances, and belongs to the series of hydrocarbon compounds, which include petroleum and natural gas. The odor resembles that of pitch, the color is black or dark brown, and it is not soluble in water. It melts easily when heated and may be dissolved in ether or turpentine. The pure article burns without leaving ashes. It is artificially produced in making coal gas, but the article of commerce is taken from the beds of lakes. Asphalt occurs most abundantly in Cuba, California, Venezuela, Palestine, and various parts of Europe. However, the largest asphalt districts are in the northern parts of South America, in the regions lying west of Lake Trinidad. The product obtained there is used in manufacturing varnish and patent leather, and for street paving. In constructing pavements a limestone mixed with asphalt is used to some extent, but asphalt paving is made more largely of cement covered by coats of asphalt, put on at a temperature of from 275 to 300 degrees.

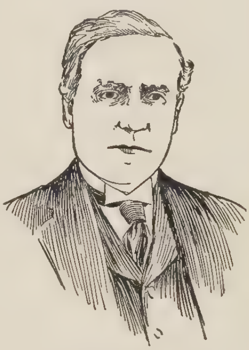
ASPHODEL (ăs'fō-dĕl), a genus of plants found in Southern Europe and the countries bordering on the Mediterranean Sea. Two species, the yellow and the white asphodel, are cultivated as garden flowers. The former has a stem from two to three feet high, which is covered with long narrow leaves, and flowers late in the spring. In the white asphodel the flowers are in clusters. The genus is represented in England by the bog asphodel, which is the daffodil of English poets. Allied species are found in the United States and the southern part of Canada.

ASPHYXIA (ăs-fĭx'ĭ-ȧ), a term used to signify a loss of pulsation resulting from an arrest of the function of respiration. This state may be produced by breathing gas destitute of oxygen, by submersion in water, strangulation, or suffocation, or by any cause that tends to prevent the breathing of pure air. Death results from asphyxia, if the person affected is not relieved in a very short time. Relief in a case of apparent death by this cause is often obtained by maintaining the heat of the body and inflating the lungs.

ASPINWALL (ăs'pĭn-wa̤l). See **Colón.**

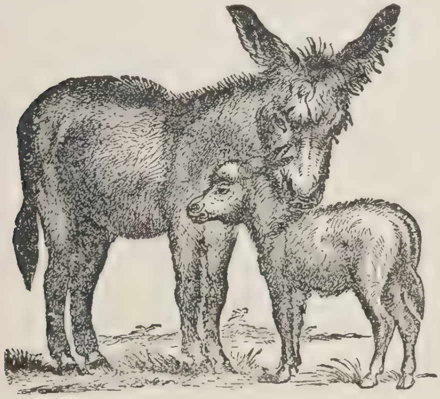
ASPIRATE (ăs-pĭ-rât). See **Voice.**

ASQUITH, Herbert Henry, statesman, born at Morley, England, Sept. 12, 1852. He studied in London and at Balliol College, Oxford, and in 1876 was admitted to the bar at Lincoln's Inn. Four years later he became a queen's counsel, after which he practiced his profession, and in 1886 was elected to Parliament for East Fife. In 1892 he became home secretary in the cabinet of Gladstone, after which time he held a number of other offices and positions of public trust. He supported the measure to disestablish the Church of Wales, in 1894, which was rejected by the House of Commons. During the Boer War he favored the policy of the government. He became rector of Glasgow University in 1905. In 1908 he succeeded Sir Henry Campbell-Bannerman as premier, serving until 1916, when he was succeeded by David Lloyd George. He died Feb. 13, 1928.



HERBERT HENRY ASQUITH.

ASS (ȧs), an animal of the horse family, but differing from the horse in being smaller, in having no hard, bony warts on the hind legs, and in its ears being longer. The hoof is smaller than that of the horse. It is thought to be an offspring from the wild ass of Abyssinia, because of its unwillingness to cross streams and its great fondness of rolling in loose soil. Asses are used more or less as beasts of burden and for draft purposes. A light, graceful breed is used in Syria by women for pleasure riding. In Arabia it is bred for the saddle, while in Damascus and other countries it is used for draft and plowing. It excels the horse on account of possessing better health in diversified climates and consumes a smaller quantity and coarser quality of food, and is superior as a beast of burden in mountainous districts, being safer on foot than any other domesticated animal. In some localities the flesh is valued as an article of food, and its skin is used in the manufacture of parchment, drum covers, shoes, and for other purposes. The hybrid offspring of this animal and the female horse is known as the mule, which is a very valuable animal for many purposes, and is extensively reared in America. It is almost as large as the average horse. The mule is reared more extensively in the southern part of the United States than in the North.


DOMESTIC ASS.

ASSAM (ăs-săm'), a province of British India, bounded by Bengal, Manipur, Burma, and China. The area is 52,057 square miles. It embraces the valley of the Brahmaputra and several tablelands and mountain districts. It has a heavy rainfall and a moderate climate, but in the southern part, near the lower course of the Brahmaputra, is an extensive region of swamps and jungles where the climate is unhealthful. The jungles are infested by tigers, leopards, elephants, rhinoceroses, and other wild animals. Rice is the chief product, but tea, cotton, and fruits are grown to a considerable extent. Iron, coal, and petroleum are the chief minerals. This section is populated largely by Hindus, most of whom are Brahmans, and about one-fifth of the people are Mohammedans. Schools and colleges are maintained and there is considerable Assamese literature. Assam has been a British possession since 1826. Sylhet, the largest town, has a population of 15,000. Shillong is the seat of government. Population, 1923, 6,122,201.

ASSASSINATION (ăs-săs-sĭ-nā'shŭn), the crime of murder committed treacherously, without immediate provocation, and usually without resistance from the person whom the assailant seeks to kill. The word originated from a secret military and religious society of Persia, founded by Hassan ben Sabbah in the 11th century, and those who are guilty of the crime are said to be *assassins*. A number of assassinations have been committed in all periods of history. In most cases perpetrators hope to further their ideas by causing the death of some public official. The following are noted assassinations:

Montenegro, Prince Daniel, killed Aug. 13, 1860.

United States, President Lincoln, shot April 14, 1865.

Servia, Prince Michael, killed June 10, 1868.

Turkey, Sultan Abdul Aziz, stabbed June 16, 1876.

Russia, Czar Alexander II., killed with dynamite March 13, 1881.

United States, President Garfield, shot July 2, 1881; died Sept. 19, 1881.

France, President Carnot, stabbed June 24, 1894.

Italy, King Humbert, shot July 29, 1900.

Uruguay, General Borda, killed Aug. 26, 1897.

Austria, Empress Elizabeth, stabbed Sept. 10, 1898.

United States, President McKinley, shot Sept. 6, 1901; died Sept. 14, 1901.

Servia, King Alexander I., shot June 11, 1903.

Russia, Katcheslav von Plehve, assassinated in Saint Petersburg, by a Finn, July 28, 1904.

Russia, Grand Duke Sergius, killed near the Kremlin, Moscow, Feb. 17, 1905.

Russia, General Sakharoff, killed Dec. 5, 1905.

Portugal, King Carlos I. and Crown Prince Luiz., shot in Lisbon, Feb. 2, 1908.

Greece, George I., shot Mar. 18, 1913.

Austria, Duke Francis Ferdinand, shot at Bosna-Serai, Bosnia, July 28, 1914.

Poland, President Gabriel Narutowicz, shot Dec. 16, 1922.

Mexico, President-Elect Alvaro Obregon shot in Mexico City, July 18, 1928.

ASSASSINS (ăs-săs'sĭns), a secret military and religious society founded in Persia by Hassan Ben Sabbah, in 1090 A. D. The principal aim was the assassination of those not members of the society. It was most prosperous shortly after its organization, but later fully 12,000 were massacred for the purpose of exterminating the order. A few adherents still remain in India.

ASSAULT AND BATTERY, a misdemeanor punishable by fine or imprisonment. An assault consists of physical force partly or fully put in motion, contrary to law, as the act of pointing a loaded gun at a person, or raising a cane to strike some one. Battery consists of actually inflicting injury upon the person of another in an angry, spiteful, or insolent manner. It may consist of striking or constraining him, or in touching him in any way while angry. An assault is assumed when the offense of battery has been committed, hence, in law, it is customary to use the phrase *assault and battery.* The crime varies in degree according to the intents with which the offenses are committed. Thus, we have the simple assault, assault and battery, assault with intent to commit great bodily injury, and assault with intent to commit arson, robbery, murder, etc.

ASSAYING (ăs-sā'ing), the art or process of subjecting coins, quantities of bullion, or alloys to examination and experiment for the purpose of ascertaining what proportion of each of the various metals they contain, as to find the amount of copper in a quantity of ore, or the amount of gold in a coin. The process of assaying depends upon the kind of metal or ore to be tested. In assaying ore containing silver the apparatus employed is a *cupel* and a muffle, a kind of fire-clay oven. The ore is placed in the cupel, which is then put into the muffle, and is heated to such an extent that the ore is melted. Some parts of the ingredients are carried away by union of the oxygen in the air with lead, and the silver remains in the cupel in the form of a molten metallic globule. When all of the ingredients have been driven out, the silver lightens in color and becomes a brilliant white. When cooled, the silver is weighed, and the amount of pure metal determined. This process is called *cupellation.* When silver contains copper, it is necessary to mix lead with the alloy before attempting to separate the copper. Another process, called *humid,* consists of dissolving the compound containing the silver with a solution of nitric acid, and afterward adding a solution of common salt. The salt causes a precipitation of the chloride of silver into white globules or small lumps. When no further precipitation is obtained by adding the salt solution, the operation is concluded, and the quantity of silver is measured by the quantity of salt solution employed. The process of assaying, of course, depends upon the kind of metal or ore tested. A skilled assayer is able to form a fair estimate of the richness of the ore from the weight and color, but accurate knowledge can be obtained only by a careful chemical test.

ASSEMBLY (ăs-sĕm'blȳ), a convention or body of men gathered to deliberate, as a convention of a religious society or a political party. The legislative branch of many states of the United States is known as a General Assembly, as in New York, Iowa, and other states, while in New Jersey the lower house is known by that term. An unlawful assembly is a gathering of a number of persons, usually three or more, bent on aiding or performing an unlawful act.

ASSIMILATION (ăs-sĭm-ĭ-lā'shŭn), a term used in physiology to designate the action of the vital organs whereby food, in the course of digestion, is modified in various ways and fitted for the use of the body, of which it finally becomes a part. The materials assimilated are brought by the blood in the capillaries to the cells, where the development of living tissues takes place. See **Absorption.**

ASSINIBOIA (ăs-sĭn-ĭ-boi'ȧ), formerly a district in the southern part of the Dominion of Canada, but divided in 1905 and made a part of the two provinces of Alberta and Saskatchewan. See **Alberta, Saskatchewan.**

ASSINIBOIN (ăs-sĭn'ĭ-boin), a tribe of Indians, so named because they dropped hot stones into water to heat it. This tribe formerly occupied the region between the Missouri and Saskatchewan rivers, on both sides of the boundary of Canada, but these Indians are now on reservations in Montana and Canada. They seceded from the Sioux and speak a dialect of the Sioux language. The total number of Assiniboins is 2,670, about half of whom are in Canada, and the balance are at Fort Peck and Fort Belknap, Mont.

ASSINIBOINE (ăs-sĭn'i-boin), a river in Canada, formed in Macdonald County, Manitoba, by the junction of the Mouse or Souris and the Qu'Appelle. From the head water of the latter to its junction with the Red River of the North, at Winnipeg, it has a length of about 475 miles. The river is so named from the Assiniboin Indians, who formerly inhabited the region through which it flows.

ASSISI (ȧs-sē'zê), a small town of Italy, in the province of Umbria, fourteen miles east of Perugia. It is noted as the birthplace of Saint Francis, the founder of the Franciscan Order of Monks, and his remains are in the first monastery of this order built in Assisi. The town is visited by many pilgrims every year. It is a beautiful place, surrounded by olive groves, and is the seat of several churches and twelve monasteries. The commune, in 1921, had a population of 17,378.

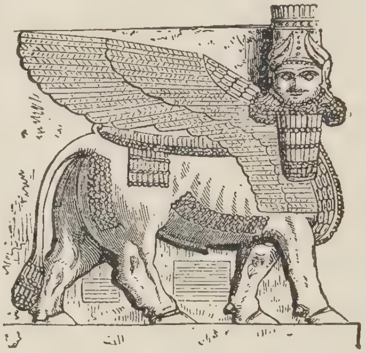
ASSOCIATED PRESS (ăs-sô-shĭ-ā'tĕd), an organization founded for the purpose of collecting and distributing news. The first association for this purpose was formed in 1849 by the owners of several New York newspapers, among them the *Herald, World, Times, Sun, Tribune,* and *Express.* Since then other associations of the kind have been organized. The object is to systematize the gathering of news by sending correspondents to different sections of the country, or even to foreign countries, by employing cable and telegraph lines and by utilizing any other means for the rapid accumulation and distribution of news. These associations not only use the news themselves, but sell all or certain classes of news in different parts of the world for use in making up daily and weekly periodicals. The Associated Press is now the largest association of the kind in America. It controls over 30,000 miles of telegraph wire and several cable lines, and is in touch with news centers in all parts of the world. The cost of the service is about $150,000 each month, and over 2,000 newspapers, published in the region from Maine to California, are furnished news daily from time to time. To facilitate the transmission of news, it is divided into Eastern, Southern, Central, and Western branches.

ASSOCIATION (ăs-sō-sĭ-ā′shŭn), in psychology, the mental process by which the mind unites objects or ideas in thought so that one tends to recall the other, especially in matters relating to memory. For example, in coming to a place where some important event occurred, or something unusual happened, the sight of the place is certain to recall the occurrence. Again, two objects long associated together, when separated, one suggests the other much more easily than if it had been associated with several different objects. This may be illustrated by the habit of a person who is accustomed to wear a coat of a peculiar color; such a coat seen under different circumstances is much more liable to suggest that person than if similar coats were worn by a large number of persons. Psychologists have formulated certain primary laws of suggestion, which, if understood by the teacher, can be made highly serviceable in the instruction of pupils. By means of a knowledge of these laws, the mind may be led from things known to a wider field through association of similar objects, or a contrast of dissimilar objects. These primary laws include similarity, under which a precept tends to suggest the concept of something like it; contrast, by which a mansion may suggest a cottage; continuity of time or place, as objects associated in time or place suggest each other; cause and effect, which tend to suggest that a certain instrument caused a wound. Under the same law the sight of a weapon suggests its danger.

ASSUAN (äs-swän′), a town in Egypt, located on the Nile, near the boundary of Nubia. It is about two miles below the first cataract, and is important as a station for the caravan trade with the Sudan. Near it is the great dam built across the Nile by the British government, and it has railway connection with Alexandria and other commercial centers of Egypt. In its vicinity are granite quarries and the ruins of a town built by the Saracens. Population, 1921, 10,380.

ASSUS (ăs′sus), or **Assos,** anciently a city and seaport of Asia Minor, on the Gulf of Adramyttium. It was built by the Greeks and in its vicinity are ruins of a theater and several temples. It remained important as a shipping point up to the beginning of the Christian era. In Acts xx., 13, it is related that both Saint Paul and Saint Peter visited Assus on their way from Troas to Mitylene.

ASSYRIA (ăs-sĭr′ĭ-a), an ancient country of Asia, in Mesopotamia. The boundary on the north was formed by the highlands of Armenia, east by Media, south by Susiana and Babylonia, and west by the Tigris. It is thought that the larger part of the valley of the Euphrates was included, but the country cannot be accurately separated from Babylonia either in the light of history or geography. The history of these two nations seems closely intertwined, and to measure the power of one is to know the weakness of the other. However, each has a history common to itself. Assyria was known to the Hebrews as Asshur and to the Persians as Athurd. The region included in Assyria is thought to have had a length of about 380 miles, a breadth of 250 miles, and an area of not less than 100,000 square miles. It is known to have possessed one of the oldest civilizations, an extensive literature, and considerable advancement in the arts and sciences. A decipherment of the cuneiform documents, inscriptions that contain much valuable information, has added materially to the knowledge of this interesting and ancient people. Besides, by the discovery of certain fragments of literature, that lay buried underneath rubbish and ashes until the middle of the last century, and by locating the site of many of the larger cities, the knowledge of this nation has been generally widened. In the Bible we are told that Nineveh, the capital city, was founded by Asshur of Babylonia, and it is probable that Assyria became powerful long after Babylonia had risen to the dignity of a mighty empire.


ASSYRIAN GOD NINIP.

Assyria and Babylonia were interdependent, and the early rulers of the former were appointed by the kings of Babylonia. After many years Assyria became independent, and by the year 1320 B. C. attained much power. The first empire was founded about 1140 B. C. by Tiglath-Pileser I., and under his reign Assyria expanded its dominion over Western Asia. He was succeeded by his son, who proved an incompetent ruler, and two centuries later Assyria was in a state of decadence. At the time of the decline of Assyria, the Hebrew kingdom developed power under David and Solomon, but in the year 930 B. C. it again grew to importance. With the ascension of Shalmaneser II., in 858 B. C., the empire reëstablished its dominion over Western Asia. This king reigned for thirty years and fought against the kings of Damascus, Hamath, and Israel. A Babylonian named Pul usurped the throne in 745 B. C. and assumed the Assyrian name Tiglath-Pileser II. However, a successful revolt occurred under Sargon, a great general of Assyria, who carried 27,000 Babylonian citizens into captivity. Later his son Sennacherib conquered Judaea and besieged Jerusalem, where a pestilence destroyed his army and saved the city from being captured. In 681 B. C. Esar-Haddon organized great military forces, effected internal improvements, made Assyria a powerful empire, and brought under its dominion, not only Western Asia, but Egypt and large portions of Northern Africa. This monarch reigned thirteen years and was followed by three others, the last of whom was known as Sarakos, whose reign terminated in seven years with the fall of Nineveh in 606 B. C., when it was captured by the allied army of the Medes and Babylonians.

Assyria was far advanced in industry, art, and civilization. In its cities were many large buildings and palaces constructed of brick, alabaster, and stone. The interior of many of these structures contained exquisite sculptures, principally figures in relief. They consisted chiefly of scenes of war and of the chase, besides other favorite subjects. It is evident from literature and ruins that have been uncovered that the Assyrians understood the construction of arches, tunnels, drains, and aqueducts, and the use of the lever, the roller, and the pulley. They engaged in the manufacture of various ornamental figures and articles of household utility, such as jars and dishes of metal, porcelain, and glass. They were acquainted with the lens, practiced the arts of inlaying and enameling, designed ornaments of ivory, bronze, gold, and silver with marked skill, and displayed a rare taste in designing and making household furniture. To the Assyrians is ascribed considerable knowledge in astronomy, since they made star charts, divided the year into twelve months, naming them after the signs of the zodiac, and divided the week into seven days, observing the seventh as a day of rest. Records were kept of the eclipses of the sun and moon, which they learned to foretell with considerable accuracy, and there is evidence that they studied the transits of stars. An astronomical work, entitled "The Illumination of the Bell," is an Assyrian publication, copies of which are now in several European museums, and in which are treated the motions of Mars and Mercury, the north polar star, the phases of the moon, the conjunction of the sun and moon, and several planets observed anciently. A department of knowledge termed *Assyriology* relates to the modern study of Assyrian antiquities. Formerly our fund of knowledge in relation to Assyrian history was based largely upon Jewish records and the writings of Herodotus, but since 1842 many extensive explorations and excavations of ancient ruins have added material of considerable extent and value.

That the Assyrians possessed an extensive literature is evidenced by various explorations of their ruined cities and excavations leading to a restoration of numerous sculptures and monuments. The most important objects of discovery were several palaces, including the palace of Asshurbanipal at Nineveh, where the remains of a large library were found. The contents included numerous tablets, text-books —some of these relating to mathematics, zoölogy, and astronomy—and various devices for representing geographical and astronomical phenomena. The literature included many poetic productions and extensive and interesting mythological writings. There were included descriptive works in geography, botany, history, architecture, chemistry, and various other lines of study, though in some of the theories held a marked similarity was shown to those entertained by other ancient nations. This circumstance is evidenced by the story of a flood represented to have destroyed all forms of life, the description being quite similar to that of the flood mentioned in the Scriptures, and they possessed a history of the creation quite like that described in Genesis. Though many of the writings were produced in the reign of Asshurbanipal, about 650 B. C., many seem to date from an earlier period.

ASTER (ăs′tẽr), a genus of plants of the *Compositae* order, so called from the close resemblance of the expanding leaves to a star. These plants are native to America and Eurasia. Many species have been developed under a long line of cultivation,. some including beautiful flowering forms. The flowers are greatly variegated in color, including purple, white, blue, yellow, and reddish, and from their tendency to flower late in the season, together with their resemblance to the daisy, they are frequently called Christmas daisies. Though several American species are counted among the finest, the China aster, a double flowering species, is generally admired as the most beautiful and showy.

ASTEROID (ăs′tẽr-oid), or **Planetoid**, the name of any individual of a great group of small planets known to exist between the orbits of Mars and Jupiter. Their origin is thought to be due to the influence of gravity exercised by Jupiter in the early formative stage, by which the formation of a separate planet was prevented according to the general principles of the evolution of planets, and as a result a large number of small bodies were composed of the existing materials. The asteroids are not evenly distributed, but occupy a position at irregular intervals, either separately or in groups. Bode's law, which indicates that a large planet should lie between Mars and Jupiter, led to an association of twenty-four astronomers in 1800, whose object was to search for the missing body. The first discovery was made by Guiseppe Piazzi (1746-1826) of Sicily in January, 1801, when he located an asteroid which he named Ceres. Three others, named Pallas, Juno, and Vesta, were discovered in 1807. A fifth was discovered in 1845, and since 1847 new bodies have been found almost every year, the whole number now being placed at about 500. They revolve around the sun at a distance of from 200,000,000 to 300,000,000 miles. Their total mass is equal to about one-fourth the mass of the earth. The asteroid Flora revolves around the sun once every 1,191 days and Hilda completes one revolution in 2,868 days, and the length of the year of the others is between these extremes.

ASTHMA (ăz′mȧ), a disease characterized by shortness of breath, and whose effects are spasmodic after intervals of comparatively good health. In common asthma the lining membrane of the air passage is affected somewhat similarly to the affections experienced in chronic bronchitis, but the affection of the mucous membrane is seated farther down in the bronchial tubes and lungs. Chronic asthma, though disagreeable and weakening, seldom shortens life. Asthma is most common among persons advanced in years, and frequently affects those of a nervous temperament. It is more common among men than women and frequently follows attacks of measles and bronchitis.

ASTIGMATISM (ȧ-stĭg′mȧ-tĭz′m), a defect in eyesight, which arises from the defective structure or malformation of the eye. It results in defective vision by inclining the affected individual to fail to see objects in the same place, though they really may be so. This is due to the rays of light converging to a point on the retina, thereby forming a line of light instead of a circular apparition. It can be remedied by the use of glasses.

ASTOR (ăs′tẽr), **John Jacob**, merchant and financier, born near Heidelberg, Germany, July 17, 1763; died in New York City, March 29, 1848. He was the youngest son of a peasant, and passed his boyhood on his father's farm, and in 1783 came to America, settling in New York City, where he soon became interested in an extensive fur trade. In 1811 he founded the settlement of Astoria, near the mouth of the Columbia River, where he established a central depot for the fur trade between the Pacific and the Great Lakes. Subsequently he engaged in gigantic speculative schemes, and at his death had an estate valued at $20,000,000. He established a hospital at the village of Waldorf, Germany, and made a gift of $400,000 to found the Astor Library in New York. This collection of books was subsequently enlarged by his son, and now contains about 300,000 volumes.

ASTOR, William Waldorf, capitalist and publisher, born in New York City, March 13, 1848. He descended from John Jacob Astor (q. v.), of whom he is a great grandson. He graduated from Columbia College in 1875, served as United States minister to Italy in 1882-85, and in 1891 removed to England, where he devoted much time to literary research. Having inherited a large fortune, he undertook many extensive and successful business speculations, and ranks among the wealthiest men of the world. Among his writings are several romances. He published various periodicals, including the *Pall Mall Gazette* and the *Pall Mall Magazine*. He died Oct. 18, 1919.

ASTORIA (ăs-tō′rĭ-ạ), a port city of Oregon, county seat of Clatsop County, on the Columbia River, seventy miles northwest of Portland. It is situated on the Astoria and Columbia River Railroad, has an excellent harbor, and is surrounded by a cereal and fruit-growing country. The industries include a large trade in lumber, salmon packing, and manufactures of furniture, clothing, machinery, and earthenware. It has several excellent public school buildings, a fine county courthouse, a public library, a United States custom house, and a hospital. Electric lights, pavements, telephones, waterworks, and sewerage are among the facilities. Astoria was founded by John Jacob Astor in 1811 and was chartered as a city in 1876. Population, 1920, 14,027.

ASTRAKHAN (ăs-trȧ-kăn′), a city of Russia, capital of a government of the same name, situated on an island at the mouth of the Volga, about twenty miles from the Caspian Sea, on which it is the principal Russian seaport. It has traffic connections by railroads and steamboat lines, electric street railways, and numerous schools, hospitals, and churches. The city has extensive stockyards, engages largely in manufacturing, and is important as a commercial city. Among the chief manufactures are clothing, machinery, cured meat, and canned fish. Salt is obtained in large quantities in the marshes of the steppes, near the city. Population, 1921, 167,142.

ASTRINGENT (ăs-trĭn′jent), in medicine, an agent which causes contraction in the organic tissues and canals of the body, and used to check discharges and excessive purging. The astringents include both vegetable and animal substances. Vegetable astringents used commonly are derived from blackberry root, kino, oak bark, rhatany, and logwood. The chief mineral astringents are nitrate of silver, acetate of lead, alum, carbonate of lime, and the sulphate and chloride of iron.

ASTROLOGY (ăs-trŏl′ŏ-jy̆), a term meaning originally the knowledge of the stars, but later limited to the practice of predicting future events from the position of the heavenly bodies. In ancient times the practice of undertaking to foretell the fortunes of men and nations was looked upon as a real science, while the mere knowledge of the fixed stars and the planets, and of their motion and volume, was considered secondary. Astrology was one of the most extensive forms of ancient superstition, and had a wide foothold at the dawn of early history among the Egyptians, Chaldaeans, Hindus, Chinese, and other people of Asia and Africa. From the East this superstition spread to Western Asia and Europe, and became firmly lodged at Rome at the beginning of the Christian era. Old writings cannot be well understood without a knowledge of astrology, while the Bible contains many allusions to this so-called science. The utter fallacy and worthlessness of this study or science was not discovered until some advancement had been made in astronomy. By the so-called "viewers of the heavens" the successes or misfortunes of a nation were predicted, this depending upon the signs that prevailed at the time of its founding, and the temperament of a child was designated from the planet under which it was born, as jovial from Jupiter. The medicinal virtue of herbs was supposed to be due to their ruling planets, and phases of the moon were taken as the index of the future greatness of a newborn child. In some countries almanacs are still published that contain astrological predictions, though the "science" has fallen into disrepute, and the authors themselves do not believe in them.

ASTRONOMY (ăs-trŏn'ô-mȳ), the science which investigates the distances, magnitudes, motions, and various other phenomena of the heavenly bodies. While the parent of all the sciences, it is truly the most perfect and beautiful. Besides, it is a science both old and ancestral, coming with resistless progress from shepherds of the Orient watching their flocks by night, thence passing to the rulers of ancient empires and the giants of modern thought until to-day it has attained a state which combines the beauty of poetry and the exactness of geometry. It has caused the civilized world to be dotted with observatories in which a great variety of instruments are utilized for weighing, measuring, and studying the celestial bodies, each striving for new discoveries and greater knowledge of the infinite space that surrounds us.

The ancient nations, including Assyria, China, Hindu, Egypt, Chaldaea, and Greece, had made material progress in studying this science long before the Christian era. A law of China required the astronomer to foretell eclipses under penalty of death. The Chinese thought that the eclipse represented a great monster, in deadly conflict with the sun, and to drive him off it was necessary to employ the gong and other instruments to frighten him away. Thales, a Grecian astronomer of 640 B. C., is regarded the early founder of the science, since he was among the first to teach that the earth is a sphere, and gave valuable aid to navigation by pointing out that the Lesser Bear is a better guide upon the sea than the Great Bear. In the year 500 B. C. Pythagoras taught that the sun is the center of the universe, around which the earth circulates. By demonstrations he made it clear that a morning and an evening star may be the same body, the difference being due to a change of position. The history of astronomy proper begins with Hipparchus, who lived in the 2d century B. C. His observations enabled him to make a chart of the heavenly bodies, which included 1,081 stars. He was succeeded by Ptolemy in the 2d century A. D., who published a book called the "Almagest," in which the Ptolemaic system was explained. He erroneously taught that the earth is the center of the universe and that the heavens revolved around it, each period of revolution occupying twenty-four hours.

Copernicus in the 16th century disproved the teaching of Ptolemy, and held that many of the theories of Pythagoras are true. His system places the sun as the center of the universe, from which the planets receive light and heat in their revolution around it. At that time his discovery could not be clearly demonstrated, and for this reason it was not generally accepted. Later Kepler announced his famous laws, and Galileo studied the heavens with a telescope. Newton won fame and added the greatest assistance to promulgate scientific study by the discovery of gravitation. By means of this discovery it became possible to account for the revolutions of the planets and satellites, and to assign a cause for their occupying exact positions in space. The satellites of Jupiter and the rings of Saturn were observed by Laplace, who also gave much valuable assistance by the publication of many works of merit. Since that time, especially during the latter part of the last century, divers notable discoveries have been made through the medium of improved instruments.

Astronomy is a very useful science, since a knowledge of the natural phenomena governing the sun, planets, and stars has made it possible to fix disputed dates of ancient battles and of the reigns of kings. It has enabled us to establish definitely the exact length of the units of time requisite for the calendar, and has aided in navigation by making it possible to guide ships from port to port at a smaller cost and a material saving of human life. Astronomy has given us a knowledge of the exact size of the earth, thereby enabling us to make accurate maps of the continents and oceans, and it is of material value in general surveying. It has enabled us to determine the exact units of time, which has made it possible to construct clocks and watches with such a degree of exactness that we may be guided by them without error in all parts of the earth.

Astronomy is interested chiefly in a consideration of the earth, sun, moon, satellites, planets, comets, meteors, and fixed stars. It teaches that the sun is the center of the universe, from which all other bodies in our solar system receive light and heat, as they revolve around it in regular orbits under the laws of gravitation. There are eight so-called planets, including Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune, the first two having their orbits within that of the earth, and the last five having orbits larger than that of our planet, and to these Vulcan, a supposed inferior planet, is sometimes added. Various symbols are used to express in an abbreviated form certain astronomical terms and the names of the sun, satellites, and planets. Below is a list of the more important symbols:

☉=The sun.
☾=The moon.
●=The new moon.
○=The full moon.
☌=Conjunction.
□=Quadrature, or differing 90°.
☍=Opposition, or differing 180°.
☊=The ascending node.
☿=Mercury.
♀=Venus.
⊕=The earth.
♂=Mars.
♃=Jupiter.
♄=Saturn.
♅=Uranus.
♆=Neptune.

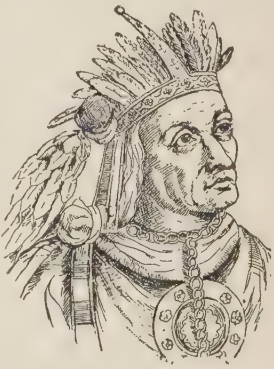
With the invention of elaborate instruments and the construction of gigantic observatories, great strides of advancement have been made, both in the discovery of heavenly bodies and in their measurements and analysis. This has caused astronomy to be divided into several branches. Astronomical geography treats of the earth, and uranography of the heavens. The study of the fixed stars is called sidereal astronomy. Physical astronomy not only investigates, but accounts for the facts observed.

Several observatories have been giving considerable attention to the study of sun spots. The authentic records of meteorological research do not extend back more than about fifty years, and in the study of solar phenomena the investigator is still more restricted. There is no record of solar prominences earlier than 1872. The largest sun spot has a diameter of 70,000 miles, and two other large spots have each a diameter of 40,000 miles. It has been found that the spots vary periodically in size, the cycle being 11.1 years, and there is also a marked variance in the number of spots visible at different times. When examined through a telescope spots appear like large irregular holes in the surface of the sun, and it is reasonably certain that they are cavities and not elevations. The sloping sides, when seen through a large telescope, seem to be made up of white filaments, while the central part resembles a great flame ending in fiery spires. It cannot be doubted that these solar phenomena have an influence on terrestrial life, but science has yet to discover their effect and purpose. See **Earth, Sun, Asteroids, Moon, Jupiter, Satellites**, etc.

ASUNCION (ä-so͞on-sē̇-ōn′), the capital and most important city of Paraguay, on the Paraguay River, 645 miles north of Buenos Ayres. It is the converging center of several railroads, and has a number of fine public buildings and modern municipal improvements. A college, the custom house, a hospital, a cathedral, and the national capitol are among the chief buildings. It has an important trade by steamship navigation on the Paraguay River and by railroads with the interior. The manufactures include clothing, machinery, tobacco, and textiles. Among the chief articles of commerce are cereals, lumber, hides, tea, coffee, and fruits. It was founded on Assumption day in 1536, hence its name, and in 1869 was occupied by a Brazilian army. Population, 1923, 60,259.

ATACAMA (ä-tä-kä′mä), a vast desert region on the west coast of South America, belonging to Chile. It is rich in gold, silver, iron, nickel, copper, lead, and cobalt mines, and there are deposits of guano on the coast. The district has an area of about 66,000 square miles. The occupation of this region has caused some contention between Chile and Bolivia, from which several wars have resulted. Formerly it belonged to Bolivia, but it was ceded to Chile in 1884. The area is about 28,500 square miles.

ATAHUALPA (ä-tä-wäl′pä), the last of the Incas rulers. He succeeded his father to the throne of Quito in 1529, while his brother Huascar ascended the throne of Peru. After these two rulers engaged in wars and the latter was defeated, the Spanish under Pizarro defeated the Incas and exterminated the leading princes. Atahualpa was captured, and, although he paid a vast ransom in gold and professed Christianity, yet he was executed by strangling in 1533. The history of the Spanish conquest of the Incas is told in Prescott's "Conquest of Peru."



ATAHUALPA.

ATALANTA (ăt-ȧ-lăn′tȧ), in Greek mythology, a famous huntress of Arcadia, the daughter of Jashus, and noted as the most swift-footed of mortals. It was agreed that the suitor who could outstrip her in a race was to obtain her in marriage, but the penalty of failure was death. Among numerous suitors was Meilanion who had obtained from Venus three golden apples and as Atalanta distanced him he threw one in her path. Each time the fair maid was charmed by their beauty and stopped to pick them up, and thereby lost the race.

ATCHAFALAYA (ăch-a̭f-a̭-lī′a̭), the name of a river and bayou in Louisiana, serving as a secondary channel of the Mississippi. It is connected with the Mississippi near the mouth of the Red River, and after a course of

225 miles toward the south enters the Gulf of Mexico by Atchafalaya Bay, 120 miles west of the main outlet of the Mississippi. Some geographers assert that the Atchafalaya constitutes the old bed of the Red River, its name signifying lost river.

ATCHISON (ăch'ĭ-sọn), a city in Kansas, county seat of Atchison County, on the Missouri River, forty-eight miles north of Kansas City. It is on the Missouri Pacific, the Chicago, Burlington and Quincy, and other railroads, has steamboat connections with Mississippi River and Gulf ports, and enjoys a large commercial trade. The manufactures include flour, machinery, hardware, clothing, tobacco products, and earthenware. It is the seat of the State Soldiers' Orphans' Home. Besides an excellent public school system, it has several colleges and private schools. Electric lights and street railways, waterworks, pavements, several libraries, and a public park are among the utilities. The city has a fine county courthouse and other substantial buildings. The first settlement in its vicinity was made in 1854 and it was incorporated in 1858. Population, 1904, 16,925; in 1920, 12,630; in 1925, 15,028.

ATHABASCA (ăth'ȧ-băs-kȧ), formerly a district of Canada, but in 1905 divided and made a part of the two provinces of Alberta and Saskatchewan. See **Alberta, Saskatchewan.**

ATHABASCA, or **Elk,** a river in Canada, rises in the Rocky Mountains, near Mount Brown, and has a length of 630 miles. The general course is toward the northeast until it reaches Fort McMurray, where it receives the Clearwater River, and thence flows north and passes through the west end of Lake Athabasca. About 35 miles beyond Lake Athabasca, which is sometimes called the Rocher River, it unites with the Peace River to form the Slave River.

ATHABASCA LAKE, a large body of fresh water in the Dominion of Canada, situated in the northern part of Alberta and Saskatchewan. The length from southwest to northeast is 200 miles and the breadth is about 30 miles. Surrounding the lake is a timbered country, mostly of poplar, fir, and spruce. It receives the water from the Athabasca River and by that stream, or the Rocher River, discharges through the Slave River into Great Slave Lake.

ATHALIAH (ăth-a-lī'ah), the daughter of Ahab, King of Israel, and wife of Jehoram, King of Judah. Her marriage led to the introduction of idolatry into Judah, and, after the death of Jehoram, she caused many members of the royal line to be slain and declared herself sovereign. After a reign of six years, she was dethroned by the armed Levites and killed. Handel's "Athalie" is based on the story of her life.

ATHANASIUS (ăth-ȧ-nā'zhĭ-ŭs), **Saint,** theologian, born at Naucratis, Egypt, in 293; died in 373. He descended from Christian parents and was brought up for service in the church, and in 319 was ordained by the Archbishop of Alexandria. In 325 he attended the council of Nice, in which he became noted as an opponent of Arianism, and the following year was elected Archbishop of Alexandria.

ATHEISM (ā'thē-ĭz'm), the doctrine that disbelieves or denies the existence of God. Among the Greeks and other ancient people atheism consisted of a denial, or nonrecognition, of the gods of the state. Some writers have doubted whether there ever were any atheists, since the doctrine of atheism is contrary to the instincts of man.

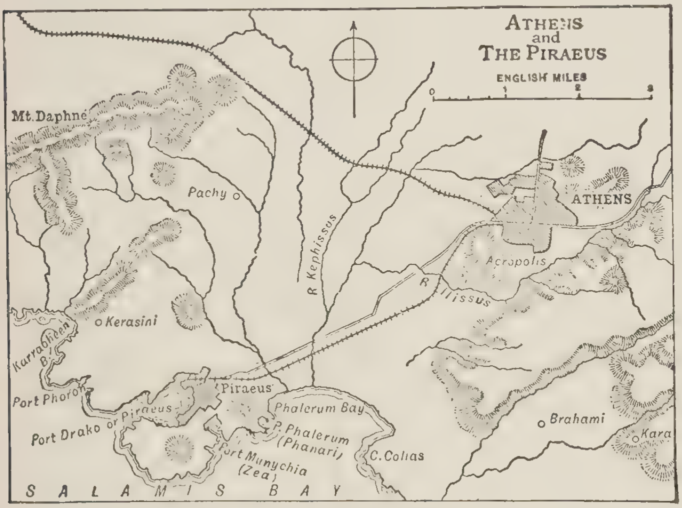
ATHELSTAN (ăth'ĕl-stăn), King of England, born about 895; died Oct. 27, 940. He was a grandson of Alfred the Great, and in 925 was crowned at Kingston in Surrey. He was the first sovereign who called himself King of England, and during his reign succeeded in uniting a number of states and bringing all of the island under his dominion, except Wales and Scotland. His government was liberal and friendly to education, and he is reputed the wisest of the Anglo-Saxon kings.

ATHENS (ăth'ĕnz), a city in Georgia, county seat of Clarke County, on the Oconee River, and on the Central of Georgia, the Southern, and the Seaboard Air Line railroads. It is surrounded by an agricultural and fruit-growing country and has a large trade in cotton and merchandise. The manufactures include flour, paper, ironware, cotton goods, tobacco products, and machinery. Besides having a fine public school system, it is the seat of the Lucy Cobb Institute, the State Normal School, the University of Georgia, and the State College of Agriculture. Electric lights, street railways, pavements, several libraries, and a fine county courthouse are among the improvements. Athens was founded in 1800 as the seat of the State University. Population, 1900, 10,245; in 1920, 16,748.

ATHENS, county seat of Athens County, Ohio, 40 miles southwest of Marietta, on the Hocking River and on the Baltimore and Ohio and other railroads. The features include the high school, court house, federal building, city hall, brick paving, public library, and many manufacturing plants. It is the seat of the Ohio State University, founded in 1809. It was settled in 1797. Population, 1920, 6,418.

ATHENS, the capital of ancient Attica, the center of Greek culture, now the capital of the kingdom of Greece. It is situated in the Plains of Attica, four miles from the Saronic Gulf, a branch of the Aegean Sea, and about an equal distance from the port town of Piraeus. The city is built around a central rocky height, called the Acropolis, an elevation about 300 feet high, and rising 600 feet above the Mediterranean. Around it are grouped the Areopagus, or the Hill of Mars; the Manseion, or the Hill of the Muses; the hill of the Nymphs; and the Hill of Pnyx. The Plains of Attica are bounded by hills, through which flow the Ilissus and the Cephisus rivers. According to tradition the city was founded in 1550 B. C. by Cecrops, a mythical hero, and was originally named Cecropia, but the name was afterward changed to Athens in honor of the goddess Athena. King Theseus, a mythical king, was an incentive to the building of the ancient city, while the great Solon made it famous for its democratic government and led to the erection of many magnificent buildings, among them the Temple of Zeus, known as the Olympium, of which ruins still remain.

When Europe was overrun by the Persians, the city was burnt, but, after the victories of Salamis and Plataea, Athenian ascendancy caused it to be rebuilt in great splendor. In the days of Themistocles were built the walls surrounding the Acropolis and many massive towers and gates, and the city was inclosed with impregnable walls. Its greatest glory was attained in the time of Pericles, when it was beautified by splendid architecture and sculpture. Important schools of history, philosophy, and poetry flourished in the time of Herodotus, Socrates, and Simonides. This period witnessed the construction of its beautiful monuments and public buildings, among them the Parthenon.



The decline of Athens began with the close of the Peloponnesian wars. At that period its walls were destroyed, many beautiful structures demolished, and, worst of all, the spirit of Grecian ambition broken. True, Demosthenes and Lycurgus still defended the freedom of the city and constructed amphitheaters for the entertainment of thousands of people, but the spirit of her greatness was largely lost. When Athens became a part of Macedonia, it continued to be the seat of philosophy and rhetoric, and, when conquered by Rome in 146 B. C., it became the teacher of that great nation. It enjoyed periods of prosperity and depression successively on account of its conquest by the Romans, Goths, Christians, and Turks. Greece was freed from Turkish dominion in 1833, since which time it has been a kingdom with its seat of government at Athens.

Modern Athens is alike prosperous in its industries and material growth, and in the development of the arts, sciences, and general education. The National University, founded in 1837, is attended by about 3,000 students, and is equipped with extensive laboratories and a library of 225,000 volumes. It is the seat of the National Museum, located in the Polytechnic School, and of schools for the study of antiquities under the direction of French, English, American, and German societies. Chief among the public buildings is the royal palace, constructed in the modern Greek style and decorated with fine paintings and frescoes. The city is traversed by electric street cars, both urban and interurban, and has railroad connection with the principal cities of Greece. Municipal systems of gas and electric plants and public waterworks, which include the ancient aqueduct of Hadrian, and other public facilities, are maintained. It is the financial center of the nation, the seat of its art and learning, and does not engage extensively in manufacturing enterprises. Those maintained are operated by private companies and make clothing, chemicals, musical instruments, earthenware, and spirituous liquors. Trade is chiefly in silk textiles, rugs, wearing apparel, and cereals used in domestic consumption. Population, 1921, 170,125.

ATHLETICS (ăth-lĕt′ĭks), the general name applied to a large variety of sports which are recognized as contests of physical skill, or are played for the purpose of developing physical strength. In a wider sense, the term embraces polo, baseball, basketball, football, lacrosse, and other games played extensively as sports and for profit. The term athletics in a narrower sense is applied more generally to the sports which hold a prominent place among the games played by students in the schools and the higher institutions of learning. Those who engage in athletics for pay are usually spoken of as *professionals,* while all others, including the athletes of schools and colleges, are termed *ama-*

teurs. Indeed, it is the object of the educational institutions to encourage athletics only in the line played by *amateurs,* since the sports are intended especially for the development of a degree of physical strength which is essential in the educational growth of the student.

The games recommended for the educational institutions are very numerous. They include those that are fitted for the gymnasium in the winter and for the campus and the green sward in autumn and spring. Another distinction is made in regard to the sexes, the games for both male and female being numerous and well understood. In most institutions the various games are promoted by organizations, frequently including one or more complete teams. The most skillful team is constituted of the best players, who are selected after competitive tests have been made, and it devolves upon this team to play competitive games with the select teams of other schools and colleges. The members of the select team have the benefit of training by the coach, who strives to bring out the greatest possible skill with the least necesary expenditure of energy. In most cases suitable clothing or specially designed suits are worn in the competitive games. The suits depend upon the game to be played, but usually include a light leather shoe, tight stockings, knee pants of light cloth, and a loose fitting shirt or waist.

The popular sports that belong essentially to athletics are classified as those of the *field* and those of the *track.* These terms have reference to a circular track and the inner field inclosed by the same. Among the *field events* are hurdling, pole vaulting, broad jumping, high jumping, hammer throwing, and discus throwing. The *track events* consist of sprinting, including sprints from fifty yards to 440 yards for short distances and from a half mile to two miles for long distances. The rules for playing are extensive and vary somewhat according to the age and experience of the players. Several competitive games are played each year by the unions and associations of school and college athletes. The national and intercollegiate games are usually played in May or in September.

The annual games of the Canadian Amateur Athletic Union have been played a number of years with marked success. This association held its championship games at Montreal on Sept. 21, 1917, and in the pole vault made a record of 11 feet 5 inches. The Intercollegiate Athletic Association of the United States is one of the organizations that has been holding annual games for many years. It held its regular annual game as usual in 1925, at which time it made a pole vault record of 14 feet 4 inches. At the same meeting the 120-yard hurdles were run in 14⅗ seconds, which is the world's record, but it was not accepted as such because a strong wind was blowing at the time. Other associations of the United States include the New England Intercollegiate Association, the Western Intercollegiate Games, and the National Amateur Athletic Union.

ATHOL (ăth'ŏl), a town of Massachusetts, in Worcester County, 22 miles west of Fitchburg. It has railroad and suburban electric railway facilities, and is a manufacturing center of tools, drills, toys, art leather, and lumber products. A high school and several fine churches are among the public buildings. It was known as Pequoig until 1762, when it was incorporated under its present name. Population, 1920, 9,792.

ATHOS (ăth'ŏs), a mountainous peninsula of Turkey in Europe, the most easterly of the three peninsulas projecting into the northwestern part of the Aegean Sea. It is from five to seven miles wide, thirty miles long, and at its extremity is Mount Athos or Holy Mountain, rising 6,350 feet above the sea. When Xerxes invaded Greece, he cut a channel across the north end of the peninsula to avoid the dangers of sailing around Mount Athos. There are several famous monasteries at Mount Athos, some dating from the time of Constantine, and they are occupied by about 7,000 monks. The occupants engage largely in gardening, fishing, bee-keeping, and the manufacture of rosaries, amulets, crucifixes, images, and furniture. The monasteries have valuable libraries containing considerable treasures in literature and manuscripts. All the monasteries are associated with the Greek Church.

ATITLAN (ä-tē-tlän'), a lake of Central America, in Guatemala, probably formed by the crater of an ancient volcano. It is ten miles wide, twenty miles long, and of considerable depth. Though several small streams flow into it, there is no visible outlet to the sea. Near the lake is Mount Atitlan, an active volcano, 12,160 feet high.

ATKINSON (ăt'kĭn-sọn), **Edward**, economist, born in Brookline, Mass., Feb. 10, 1827; died Dec. 11, 1905. He took a course at Dartmouth College, and attained considerable eminence as a writer on economic questions. His chief writings and addresses are devoted to the labor question and in favor of a bimetallic monetary standard. In the presidential campaign of 1900 he became known extensively by the publication of various circulars relating to the Philippine War. Among his best known works are "Industrial Progress of the Nation," "Labor and Capital," "Railroads in the United States," "Science of Nutrition," and "Cost of a National Crime."

ATLANTA (ăt-lăn'tȧ), the capital of Georgia, county seat of Fulton County, familiarly called the "Gate City to the South." It is situated in the northwestern part of the State, about 100 miles northwest of Macon, and it is the focus of a network of railroads that furnish transportation facilities to many points north and south, including the Southern, the Seaboard Air Line, the Western and Atlantic, the Central of Georgia, and a number of others. The city is platted in the form of a circle, with an area of about 36 square miles, and is the largest and most important commercial center of the State. Many of the streets are paved with stone and asphaltum, and avenues of trees ornament the residential centers. Piedmont Park, the site of the Atlanta Exposition in 1895, is a beautiful and interesting tract of land. Several memorial buildings and monuments, including one erected to the memory of H. W. Grady, adorn public places. Electric street railways traverse the principal thoroughfares, and interurban lines furnish facilities to reach many points in the vicinity. Grant Park is popular as a place of recreation. Fort McPherson, four miles distant, is a government army post.

As an educational center Atlanta takes high rank, being the seat of numerous societies and educational institutions. Atlanta University, Atlanta Baptist College, Clark University, Gammon Theological Seminary, Morris Brown College, and a number of professional and business colleges are among the educational institutions. It is the seat of the Georgia School of Technology, a branch of the State University at Athens. A Carnegie library and the State library have collections of well-selected books and documents. The Grady Hospital, the Presbyterian Hospital, a Florence Crittenden home, an orphan asylum, and other charitable institutions are maintained. The State capitol, built of limestone and decorated with Georgia marble, cost about $1,000,000. Other public buildings include the custom house, the county courthouse, the city hall, a Federal prison, a fine union passenger station, and many modern business blocks. The manufactures are extensive and consist chiefly of cotton goods cotton-seed. oil and cake, earthenware, machinery, hardware, cigars, and farming implements. A large export trade is carried in live stock, especially horses and mules, and in cotton and raw and manufactured tobacco.

The first settlement on the site of Atlanta was made in 1836, but it was some time before many business establishments located here. In 1843 it was incorporated as Marthasville and two years later the name as changed to Atlanta. In 1861, at the beginning of the Civil War, the population was about 11,000. The Confederates fortified it strongly and held it until 1864, when it was captured by General Sherman and nearly destroyed by fire. Soon after the close of the war it began to rebuild, and its growth and development have been constant since that time. It was made the capital of the State in 1878. Conveniently located, having numerous substantial institutions, and being the center of a large trade, its future prosperity is assured. Population, 1920, 200,616.

ATLANTIC (ăt-lăn'tĭk), a city in Iowa, county seat of Cass County, on the East Nishnabotna River, and on the Chicago, Rock Island and Pacific Railroad. It is surrounded by a fertile farming and dairying country, and has manufactures of canned goods, ironware, and machinery. Among the chief buildings are the county courthouse, the high school, and several churches. It has electric lights, sewerage, and waterworks. Atlantic was incorporated in 1869. Population, 1920, 5,329; in 1925, 5,524.

ATLANTIC CABLE (kā'b'l), a cable line laid from America to Great Britain. The project of providing means to communicate by cable connections with Europe was successfully completed in 1866, though two attempts had failed previously. The *Great Eastern* laid 1,200 miles in 1865, when the cable broke, but the next year connection was established. The cable line connects Heart's Content, Newfoundland, with Valentia, Ireland, a distance of 2,300 miles. Since then other lines have been laid to Europe, and there are numerous similar lines in different parts of the ocean. In 1908 there were twenty cables at the bottom of the Atlantic. It is now possible to effect rapid communication with practically all important parts of the earth.

ATLANTIC CITY, a city of New Jersey, in Atlantic County, on the Atlantic seacoast, sixty miles southeast of Philadelphia. It is situated on the Pennsylvania and the Reading railroads, and has transportation by a network of electric lines. The city is located on Absecon Beach, an island about ten miles long and three-fourths of a mile wide, and is popular as a pleasure and health resort. The manufactures are not important, but it has large banking and financial interests. Electric lights, pavements, waterworks, and a public library are among the facilities. The prominent institutions include the Children's Seashore Home, the Atlantic City Hospital, and the Mercer Memorial Home for Invalid Women. The first settlement was made in 1780, but its prosperity dates from 1854, when the Camden and Atlantic Railroad was completed. During the summer it has a transient population of about 275,000, for which there are ample hotel and villa accommodations. Population, 1905, 37,539; in 1920, 50,682.

ATLANTIC OCEAN, the great expanse of sea between the western coasts of Europe and Africa and the eastern coasts of North and South America, and extending from the Arctic to the Antarctic Ocean. Its width between Norway and Greenland is 930 miles, between Brazil and Africa, 1,600, and from North Africa to Florida, 4,250, and its area aggregates about 30,000,000 square miles. The shape of its shore line is that of a long troughlike valley with nearly parallel sides. It has a broad connection with both polar oceans, and forms the only open channel for the intermingling of warm and cold currents. By recent soundings, it has been found that the Atlantic possesses a large submarine plateau, extending in mid-ocean parallel to the coasts of the continent, from the southern portion of Africa to Iceland, thus dividing the basin into eastern and western valleys. The western valley is the deeper, the average depth of the two being 18,000 and 13,000 feet respectively. From Newfoundland to Ireland extends a remarkable plateau across these valleys, known as the Telegraph Plateau, on which a number of cable lines are located. The general depth along this swell ranges from 10,000 to 13,000 feet.

The true bed of the Atlantic Ocean commences some distance from the eastern coast of North America. Its depth for a distance of seventy-five to one hundred miles is about 600 feet, but from this region it descends to great depths. A large submerged plateau connects the British Isles with the continent of Europe, which passes through the North Sea, and extends for a considerable distance off the western and southern coasts. The greatest depth yet discovered in the Atlantic is north of Porto Rico, where it exceeds 27,300 feet. While the Atlantic is smaller than the Pacific Ocean, it is much stormier and vastly more important to trade, for the reason that the great commercial nations of the world occupy its shores. Thousands of ships sail upon it, and from its ports extend steamboat lines to all parts of the world. This has caused many improvements in the form of lighthouses to be made, and its shores and important points in mid-ocean have been carefully surveyed.

The Atlantic is divided into the North Atlantic and the South Atlantic by the Equator, the former containing in the neighborhood of 17,000,000 square miles, and the latter about 13,000,000. Nearly one-half of the water discharged by the rivers of the world flows into it. Through it flow many useful warm and cold currents, which have been carefully surveyed and are extensively utilized in commerce. They have much value in tempering the climate of various countries. The most important is the Gulf Stream. This makes a bold curve from the Gulf of Mexico, flows northward in high ocean, modifies the climate of Newfoundland, and then divides. From its division one current passes to the vicinity of Iceland and the British Isles, and the other returns to the tropical seas by the way of Spain and Africa. Thus, it has a favorable effect upon the former as a warming influence, and upon the latter as a moderating factor of the tropical climate prevailing along its western coast.

ATLANTIS (ăt-lăn′tĭs), an island mentioned by Plato as the home of a great nation, and which was submerged in the sea. It was said to have existed several thousand years before the time of Plato, in the Atlantic, west from the Strait of Gibraltar, and in size was larger than Libya and Asia Minor. It was the reputed home of a great nation that conquered western Europe and Africa, and, to relieve humanity, the gods sent an earthquake to submerge it in the sea. By some the legend has been accepted as true, and the shallowness of the ocean at that point is cited in proof, while others think it refers to an early discovery of America.

ATLAS (ăt′las), in Greek legend, the husband of Pleione and the father of the Pleiades. He became a Titan leader and tried to storm the heavens, for which he was condemned by Zeus to support the vaults of heaven on his head and neck. In the 16th century Gerald Mercator first used the figure of Atlas bearing the globe on a title page of a collection of descriptive maps and charts, from which such works have since been commonly known by that name.

ATLAS, a chain of mountains in North Africa, between the Mediterranean and the Sahara Desert. They start near Cape Nun, on the Atlantic coast, and extend to Cape Bon, passing through Morocco, Algeria, and Tunis, a distance of about 1,500 miles. There are two parallel ranges called the Little and the Great Atlas; the former is nearest the coast, and the latter borders on the desert. Mount Jehel Ayashi, in Morocco, attains a height of 14,600 feet above sea level and is the highest peak. Fine forests and vegetation common to Europe abound, the former including the oak, pine, ash, cork oak, and poplar. They yield large quantities of valuable minerals, including gold, silver, coal, copper, iron, lead, and antimony. In 1900 valuable petroleum wells were found in Algeria. In some of the valleys are fine cities, and there are several railroads crossing different sections.

ATMOSPHERE (ăt′mŏs-fēr), the invisible elastic envelope that surrounds the earth, but the term is applied to the gaseous envelope surrounding any heavenly body. The atmosphere consists of gaseous matter extending from thirty-five to 200 miles above the surface, and is of varying density, this property depending upon its height. The lower layers are more dense than the others because they bear the weight of those above them, and the density diminishes rapidly as we ascend. It presses uniformly in all directions, and for this reason its weight remained longer undiscovered. Torricelli, an Italian philosopher and a pupil of Galileo, discovered its weight by the use of an instrument called the barometer. That the atmosphere possesses weight can be proven successfully by filling a bottle with air, weighing it, then extracting the air by means of an air pump, and when weighed it will be sensibly lighter than at first.

The pressure of air at the level of the sea is 14.73 pounds per square inch, and the total weight of the atmosphere is 11½ trillions of pounds, or about $\frac{1}{188,000,000}$ of the total weight of the earth. This enormous pressure is exerted on the human frame and all objects on earth's surface. The pressure sustained by a single individual is estimated at fourteen tons, but, as it is exerted equally and in all directions and permeates the whole body, no inconvenience is caused by it. The more striking phenomena, which are to a large extent dependent upon the atmosphere, include animal and vegetable life, disintegration of rocks, polar and terrestrial radiation, storms and weather, twilight, and the propagation of sound. The atmosphere contains, among other constituents, oxygen, nitrogen, argon, aqueous vapor, carbonic acid gas, and ozone. In general it contains more or less sulphuric acid gas and hydrogen. Nitric acid is often noticeable in the atmosphere after thunder storms. It also contains small particles of organic and inorganic substances. See **Air.**

ATOLLS (å-tŏls′). See **Coral.**

ATOM (ăt′ŭm), according to some philosophers, the primary part of molecules not further divisible. The atomists believe that atoms are unalterable in size and shape; that they cannot be cut nor scratched by the sharpest tools; neither can they be twisted, flexed, or bent by the most powerful forces, and are not affected by cold or heat. They reason that in each kind of elementary substance the atoms have the same weight and size, but that in different kinds of elementary substances the atoms are of different size and weight. Thus, all atoms of gold are of the same weight and size, no matter from what part of the earth the gold may come. In like manner, the atoms of iron are of the same weight and size, but the atoms of gold are not of the same weight and size as the atoms of iron. Among the chief writers of ancient times who held to this theory are Moschus of Sidon, Epicurus, Democritus, and Lucretius. Now the view is generally held that atoms are divisible into exceedingly small particles known as electrons, which are believed to be the ultimate unit of all matter. See **Einstein Theory.**

ATOMIC THEORY (å-tŏm′ĭk thē′ô-rȳ), the theory according to which all the elements in compound bodies combine in certain uniform proportions. According to this view it is assumed that all bodies are composed of ultimate, indivisible atoms, the weight of which varies with the different kinds of matter. The opposite of this theory is that bodies, particularly those having no apparent organization, such as water, are continuous and homogeneous, and may be divided and subdivided indefinitely. The atomists assert that after a definite number of subdivisions the parts can no longer be divided, as each of the primary parts constitutes an atom. The theory owes its origin to John Dalton (1766-1844), who published his "New System of Chemical Philosophy" in 1807. He held that the atoms of each element are incapable of being subdivided, and that each has a definite relative weight, which is as one compared to hydrogen. While some of his theories are not well established, many chemists have followed him in adopting the terms used by him; namely, atom and atomic weight, in preference to proportion, combining proportion, and equivalent.

ATOMIC WEIGHTS, the proportions by weight in which chemical elements unite. Chemists, after carefully weighing numerous compounds, have determined the weight of the different elements as compared with the weight of the atom of hydrogen, which is taken as 1. All the other elements are represented by a quantity equal to the minimum amount in which they unite with 1 of hydrogen. A committee of German chemists prepared the standard system of atomic weights now in general use, in which the atomic weight of hydrogen is 1 and that of oxyden 16. See **Chemistry.**

ATONEMENT (å-tŏn′ment), literally at-one-ment, the act of reconciling persons at variance with each other, or the reconciliation of God to men, and men to God. The term is also used to designate the means by which the reconciliation is accomplished. It is used fifty-eight times in the Old Testament, and all but five of the places where it is found occur in the Pentateuch.

ATRATO (å-trä′tô), a river in Colombia, in South America, which rises near the Cordilleras and flows into the Gulf of Darien. Its course of about 400 miles is northward, and it is navigable about half that distance. Formerly the Atrato was considered in connection with the construction of a canal between the Atlantic and the Pacific, but surveys made in 1870 proved it unsuited and the project was abandoned.

ATROPHY (ăt′rô-fȳ), a morbid condition in plants and animals, causing a waste or decrease in size of a part or of the entire body. It causes interference in nutrition, hence the substance in the parts affected either decays or is wasted. Atrophy occurs normally in old age, when all of the organs undergo atrophic changes, but young life is affected by it through severe exposure, unwholesome food, impure air, and arsenic and other poisons.

ATTACHMENT (ăt-tăch′ment), a legal process issued by a court, under which the sheriff or a like officer is directed to seize a person or property. A writ of attachment is issued in connection with an action at law, and the person or property taken into custody is held until the proceedings are completed and final judgment is rendered, when disposition is made under an order of the court. Writs of this character were formerly issued against persons by most governments, but they have been discontinued in many countries, and writs to seize property are used chiefly as a means of protection against fraud, to prevent their removal before a debt or judgment can be satisfied.

ATTAINDER (ăt-tān'dẽr), a legal term used to designate a special act of a legislative body inflicting capital punishment, or declaring a forfeiture of civil rights, upon a person for high crimes, without having been first convicted in a court of law. The person against whom such an act is passed is said to be attainted. As a result the person attainted forfeits his property and is debarred from inheriting from any one. These laws do not exist in highly civilized countries. The Constitution of the United States contains the following provision: "No bill of attainder shall be passed, and attainders of treason, in consequence of a judicial sentence, shall not work corruption of blood or forfeiture except during the life of the person attainted."

ATTAR (ăt'tẽr), a name used in the East Indies to designate a perfume made from flowers. The name is generally applied to *attar* or *ottar of roses,* which is an oil extracted from the petals of roses. It is secured largely from the musk rose and the damask, and is very expensive owing to the difficulty of obtaining it. Fifty thousand roses yield only about ninety grains of attar. It is manufactured in Cashmere, Damascus, and Rumelia, where large rose farms are profitably cultivated. The oil is of various tints, usually yellow, green, or red, and liquifies at about 84°. An adulterated form is made by adding geranium, sandalwood, and rhodium. The pure oil is expensive, usually selling at about $40 per ounce.

ATTENTION (ăt-tĕn'shŭn), the act of fixing the mind upon any one object or class of objects, or directing the energies of the mind to a definite purpose. It is voluntary or involuntary, and may be trained and its power of concentration increased by practice. Voluntary attention is controlled by the will and requires effort, while involuntary attention is without effort and predominates in young children. Memory depends in a large measure upon attention, and the power to recall at will our mental impressions and acquisitions is perhaps directly in proportion to the attention given to the subject at the time mental effort was put forth. The mind has imperfect control of its thoughts when the attention, while directed to some subject of study, was feeble, loose, or accidental, and formed with little volition. Since attention is the foundation of all knowledge, it requires careful training and exercise, else the mind will be wanting in the chief quality of a sound intellectual character.

Attention is dependent in a large measure upon the physical condition. When the body has been exhausted by labor, either bodily or mentally, or is weakened by disease, it is not possible to concentrate the attention upon an object of thought. An effort to exercise the attention under such conditions causes nervousness. If trained rightly during childhood and youth, the power to fixed the attention upon objects for a definite purpose becomes habitual, and this training, combined with healthful physical functions and the selection of worthy objects of thought, make easy the accomplishment of difficult tasks. Attention is dependent in a large measure upon interest.

ATTICA (ăt'tĭ-ka), a state of ancient Greece, including an area of 840 square miles, and lying east of the Saronic Gulf. The surface is diversified by several mountain ranges, which rise to heights approximating 4,600 feet, though the mountain slopes and intervening valleys possess considerable fertility. This region was cultivated to fruits and cereals in the time of Solon, and still yields considerable quantities of olives, figs, grapes, cereals, goats, sheep, and cattle. At present Attica and Boeotia form a state in the kingdom of Greece, which has an area of 2,475 square miles and a population of 313,069.

ATTICUS (ăt'tĭ-kŭs), **Titus Pomponius,** eminent Roman, born in 109 B. C.; died in 32 B. C.. He possessed great wealth and during the civil wars between Sylla and Marius resided in Athens, where he received the surname *Atticus.* Sulla recalled him in 65 B. C. to Rome, where he became celebrated for his hospitality and for his friendship with Caesar, Pompey, Brutus, Cicero, and Antony. Several letters were addressed to him by Cicero as a mark of friendship, and he wrote a general history extending over a period of about 700 years.

ATTILA (ăt'tĭl-å), king of the Huns, born about 406 A. D.; died in 453. He and his brother Bleda succeeded Roas, his uncle, as leader of the Huns about 434, when the dominions of this people extended from the Rhine to the Volga. The Christians looked upon him with fear and dread, but he was held in high esteem by his own people. He laid claim to having discovered the sword of the Scythian god of war, boasted that where his horse had set foot grass never grew, and alluded to himself as the scourge of God. His dominions were extended from the Rhine to the northern frontier of China, largely through the instrumentality of awe and confidence inspired among his soldiers. In the year 450 he carried successful wars to the region lying between the Black Sea and the Mediterranean, and in 451 fought a decisive battle against the Romans on the field of Chalons, in the region where Chalons-sur-Marne, France, is now situated, where the latter under Actius were aided by the Gothic king, Theodoric, and Attila was defeated with gigantic losses. The fearful slaughter attending the contest was the means of saving Christianity and Aryan civilization to Europe. In the following year, still burning with revenge, Attila crossed the Alps and descended into Italy, where he conquered city after city, spreading destruction with the torch. While marching upon Rome, he was met by Pope Leo I., who visited the barbarian in his camp to plead that the city might be spared. Overcome with the majestic mien of the pope and the glory of Rome, he agreed to spare the city and returned to the banks of the Danube. His death occurred on the night of his marriage to Hilda, at his capital, Pannonia, from the effects of bursting a blood vessel, though some writers think that he died by violence through the treachery of his newly wedded wife, whose people, the Burgundians, had suffered by his marauding raids. Attila was of Kalmuck-Tartar origin, bore a large head and broad shoulders, and animated his soldiers with his stately walk and brilliant eyes. No traces were left by him in history aside from the ruins he had wrought.

ATTLEBORO (ăt't'l-bŭr-rō), a town of Massachusetts, in Bristol County, thirty miles southwest of Boston, on the New York, New Haven and Hartford Railroad. It is an important manufacturing center, producing considerable quantities of textiles, buttons, braid, jewelry, clothing, and machinery. The public library has about 9,750 volumes. It contains an almshouse and the Attleboro Home Sanitarium. The city has an extensive system of electric railways, pavements, electric lights, and sewerage. The first settlement was made in 1669 and it was incorporated in 1694. Population, 1905, 12,702; in 1925, 20,623.

AUBER (ō-bâr'), **Daniel Francois Esprit,** composer, born at Caen, France, Jan. 29, 1782; died May 12, 1871. He studied music under Cherubini and produced many operas remarkable for grace and originality. In 1829 he was elected a member of the Institute. "Emma," an opera which is much admired, is one of his chief works.

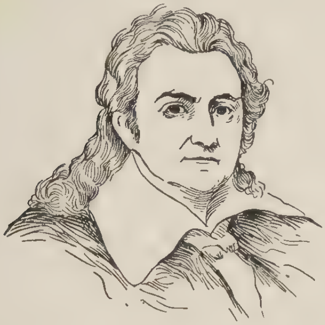
AUBURN (ạ'bûrn), a city in Maine, county seat of Androscoggin County, on the Androscoggin River and on the Grand Trunk and the Maine Central railroads. The river supplies an abundance of water power for manufacturing purposes, and the surrounding country is generally fertile. The manufactures include boots and shoes, cotton and woolen goods, flour, earthenware, and machinery. Among the chief buildings are the county courthouse, the public library, and several schools and churches. Electric street railways, waterworks, and sewerage are among the public utilities. Lake Auburn, Lewiston Falls, and Poland Springs are scenic points near the city. The first settlement was made in 1786 and it was incorporated in 1842. Population, 1900, 12,951; in 1920, 14,114.

AUBURN, a city in New York, county seat of Cayuga County, on the outlet of Owasco Lake, and on the Lehigh Valley and the New York Central railroads. It is handsomely built, has extensive water power, and is the seat of numerous factories. The chief products include farm machinery, textile fabrics, engines, buttons, twine, carpets, shoes, boxes, and machinery. The surrounding country is farming and dairying, and contains extensive orchards and vineyards. Auburn is the seat of a State prison since 1816. The Seymour Library, located in the Case Memorial Building, contains a fine collection of books. Mrs. D. M. Osborne is the founder of a school for working girls located here. Other institutions located here include several schools and hospitals, an armory, and the Auburn Theological Seminary. Auburn was the home of William H. Seward and has a bronze statue of him. Gas and electric lights, street railways, waterworks, public playgrounds, and a number of parks are among the conveniences. The first settlement was made in 1792, when the place was called Hardenburgh's Corners, from Capt. John L. Hardenburgh. In 1805 it became the county seat and was named Auburn from the village described in Goldsmith's "Deserted Village." Population, 1905, 31,423; in 1925, 35,677.

AUCKLAND (ạk'lạnd), an important city of New Zealand, in the province of Auckland, and formerly the capital of New Zealand. It is supplied with excellent railroad facilities, has regularly platted streets, and enjoys a considerable export and import trade. It has a number of fine school buildings and churches, and it is the seat of Saint John's College. A public library, sewerage, waterworks, and electric street railways are among its utilities. The manufactures include clothing, earthenware, machinery, and railroad cars. The city was founded in 1840, and its rapid growth dates from 1857, when valuable deposits of gold, copper, iron, and coal were discovered in the vicinity. Population, including suburbs, 1921, 132,676.

AUCKLAND ISLANDS, a group of volcanic islands lying about 180 miles south of New Zealand. The soil is generally fertile. They have extensive forests, productive fisheries, and a considerable trade. The entire group includes a large number of islands, but only three are of considerable extent. Auckland, the largest island, is thirty miles long and fifteen miles wide. These islands were discovered by Captain Briscoe in 1806, and are mainly important as a whaling station in the south seas.

AUDUBON (ạ'dû-bŭn), **John James,** eminent naturalist, born on a plantation in Louisiana, May 4, 1780; died in New York City, Jan. 27, 1851. He descended from French parentage, his father being an officer in the French navy, and at an early age manifested much interest in birds and plants. His early training was obtained in America, but in 1797 he studied painting in France, and subsequently settled on a farm near the Schuylkill River, in Pennsylvania. There he came in contact with nature studies, accumulating a large stock of specimens of birds and plants, and in 1810 descended the Ohio, settling in Kentucky. In 1824 he made partial arrangements for the publication of the results of his labors, for which purpose he went to Philadelphia and New York City, but was unable to finance the enterprise. He exhibited 450 colored plates of birds, drawn by himself, in England, in 1826, where he published his great work entitled "The Birds of America." This work consists of five volumes and is illustrated with 148 beautiful colored plates of 1,065 species of birds in the natural size. He made extensive explorations in America in 1829, visiting the forests and coasts from Canada to Florida, and soon after published "Ornithological Biography." After 1839 he resided on the Hudson River, at Minniesland, now Audubon Park in New York City. With Dr. Bachman he published "The Quadrupeds of North America." The Audubon Society, an association to protect and study birds, was named in his honor.


JOHN JAMES AUDUBON.

AUER (ou'ẽr), **Alois**, printer, born in Wels, Austria, May 11, 1813; died July 10, 1869. He became a printer and a student of languages. In 1841 he was appointed director of the state printing plant in Vienna, one of the largest establishments of the kind in Europe. He invented several presses and discovered what is known as spontaneous impression in photography. His chief publications are "The Lord's Prayer in 206 Languages," in the national alphabets," "The Lord's Prayer in 608 Languages," in Roman type, and "The Discovery of Spontaneous Impression."

AUERBACH (ou'ẽr-bäk), **Berthold**, author, born in Nordstetten, Germany, Feb. 28, 1812; died in Cannes, France, Feb. 8, 1882. He studied at Tübingen, Munich, and Berlin, and devoted himself to philosophy and literature. A number of his writings have been translated into various languages, some of them attaining a permanent place in literature. In 1870-71 he accompanied the German army into France as a reporter. While most of his works are somewhat overweighted with philosophical passages, his "On the Heights" is a delightful and entertaining production. His chief writings include "Village Stories Told of the Black Forest," "Judaism and the Newer Literature," "Villa on the Rhine," and "Master Bieland."

AUGEAS (au'geas), in Greek mythology, the son of Helios and the King of Elis. It is reputed that he had 3,000 oxen in his stables, which had not been cleaned for years, and the task of removing the accumulation in a single day was one of the labors of Hercules, who turned the Alpheus River and removed the mass by having the current of water sweep away the ordure. Augeas was slain by Hercules when he refused to pay the wages stipulated.

AUGER (a̦'gẽr), a tool used for boring holes larger than those bored by a gimlet. The auger is drawn into the wood by a screw at the point, above which, at each side, is a cutting lip and a spiral pod, the cutting lip to cut and the spiral groove to discharge the chips. At the upper end is a handle placed crosswise by which the auger is turned with both hands. The smaller augers usually consist of bits that fit into a brace or bitstock, and have the advantage of being more easily handled.

AUGSBURG (owks'bo͞org), a city of Germany, in Bavaria, at the confluence of the Lech and Wertach rivers, thirty-two miles northwest of Munich. It is the converging center of several important railroad lines and has a considerable commercial trade. Within the last decade it has grown rapidly as an industrial center. The manufactures include machinery, paper, jewelry, musical instruments, and clothing. Augsburg has long ranked as an important money market of Europe, and as the seat of extensive book-printing establishments. It has electric street railways, sewerage, stone and asphalt pavements, a large public library, and several fine parks. Among the chief buildings are the Church of Saint Anna, the memorial chapels of the Fugger family, the Church of the Holy Cross, the city hall, and the theater. Many of the streets are adorned with fine fountains and statues. The city is famous as the place where the Confession of Augsburg was concluded, which constitutes the confession of faith adopted by the Protestants on June 25, 1530. The first settlement was established on the site of Augsburg by Augustus in 12 B. C., when that Roman general conquered the Vindelicians. Population, 1920, 102,293.

AUGSBURG CONFESSION, the first Protestant confession of faith, containing the doctrinal definition of the Lutheran Church, and adopted at Augsburg, Germany, June 25, 1530. The confession was prepared by Melancthon and approved by Luther, and was read in a diet convened by the German princes and estates. It was written in Latin and German and read aloud before the diet in German, but both have probably been lost. In this document the belief of its supporters is set forth in a terse and dignified manner in twenty-one articles. This confession and the two catechisms written by Luther constitute the accepted confessional theology of the Lutheran Church.

AUGUST (a̦u'gust), the eighth month of the Gregorian year, so named in honor of Emperor Augustus. In the Roman calendar it was the sixth month, hence was named *Sextilis.*

AUGUSTA (ạ-gŭs′tȧ), a city in Georgia, county seat of Richmond County, on the Savannah River, 135 miles northwest of Charleston, S. C. It is situated on the Central of Georgia, the Southern, and other railways, and has a large trade in cotton, cereals, and merchandise. The streets are broad and well improved by pavements, sewerage, waterworks, electric lights, and avenues of shade trees. Transportation to urban and interurban points is by an extensive system of electric railways. Among the noteworthy institutions are the Medical College of Georgia, the Richmond Academy, the Masonic and Odd Fellows' halls, the Louise King Home, the Paine's Institute for Colored Students, and the Augusta Orphan Asylum. It has a number of parks, a Confederate soldiers' monument, and a monument dedicated to the Georgia signers of the Declaration of Independence. The public library contains 20,500 volumes. It has a fine courthouse and many large business buildings, such as the Cotton Exchange and the Georgia Railroad Bank. The Augusta Canal, a watercourse about nine miles long, supplies an abundance of water for city use and for manufacturing purposes. The chief manufactures are cotton and woolen goods, clothing, tobacco products, machinery, and earthenware. The city was platted under a royal charter in 1735, and is one of the oldest cities in the State. In the Revolutionary War it was captured by the British and held for two years, but was recaptured in 1781 by Gen. Henry Lee after a siege of thirteen days. Population, 1900, 39,441; in 1920, 52,548.

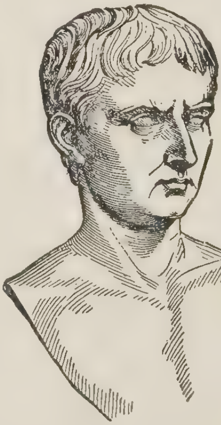
AUGUSTA, the capital of Maine, county seat of Kennebec County, at the head of tide water on the Kennebec River. It is on the Maine Central Railroad and has connection by steamer with Boston and Portland. The city is finely situated and improved by an abundance of shade trees, and the river is crossed by a handsome bridge. The river furnishes an abundance of water power, thus giving it considerable advantage for manufacturing purposes. The chief products include paper, cotton and woolen goods, furniture, clothing, and machinery. Electric street railways, waterworks, pavements, and sewerage are among the utilities. The capitol building is the most prominent structure and is built of granite. Other buildings include the county courthouse, the post office, the city hall, and the United States Arsenal. It is the seat of Saint Catherine's School, an institution for the education of young ladies. In 1831 it was made the capital of the State. Population, 1920, 14,114.

AUGUSTINE (ạu′gŭs-tīn), **Aurelius Augustinus, Saint,** an eminent father of the Latin church, closely associated in church history with Ambrose, Jerome, and Gregory the Great, born in Numidia, in Africa, Nov. 13, 354; died Aug. 28, 430 A. D. Tagaste, a small town of Numidia, was his nativity, where his father, a pagan nobleman of moderate fortune, owned an estate. He attended the best schools of Madaura and Carthage, whence he proceeded to Milan for the purpose of instructing in rhetoric. While there he met Ambrose, then Bishop of Milan, who became his close friend. In 396 he was converted to Christianity and became Bishop of Hippo, in North Africa, where he ministered to the wants of a church until his death, a period of thirty-five years. Soon after reaching his charge he was made assistant bishop, but later became bishop, and showed remarkable diligence in preaching and writing. He did not only exercise a lasting influence on the church, but is regarded one of the most profound thinkers among the early writers. Among his best-known writings are "Remarks on the Four Gospels," "The City of God," "Confessions," and "Epistles."

AUGUSTINE, or **Austin,** Archbishop of Canterbury, called the *Apostle of England,* born in the first half of the 6th century, died at Canterbury, May 26, 604. He is first mentioned as a Benedictine monk in the monastery of Saint Andrews at Rome. Pope Gregory I. sent him with forty monks to England, where he was detailed to work among the Saxons. The latter not only received him with kindness, but gave marked heed to his teachings, and many were baptized into the faith. A large number of the heathen temples were converted into Christian churches under his direction.

AUGUSTULUS (ạu-gŭs′tů-lŭs), **Romulus,** the last Roman emperor of the West, ascending the throne in 475. He succeeded his father, Orestes, but was overthrown by Odoacer, a year after taking charge of the government, and was banished to the castle of Lucullus in Campania.

AUGUSTUS (aw-gŭs′tus), **Caius Julius Caesar Octavianus,** first emperor of Rome, born Sept. 23, 63 B. C.; died at Nola, Aug. 19, 14 A. D. He was the son of Caius Octavius and Atia, a daughter of Julia, the youngest sister of Julius Caesar, by whom he was adopted as son and heir. After the assassination of Caesar, he returned to Rome to claim Caesar's property, which Mark Antony yielded after some hesitation. In 43 he was chosen praetor and formed the first triumvirate with Antony and Lepidus, which resulted in the assassination of 300 senators and 2,000 knights of the opposition party. He and



CAIUS AUGUSTUS.

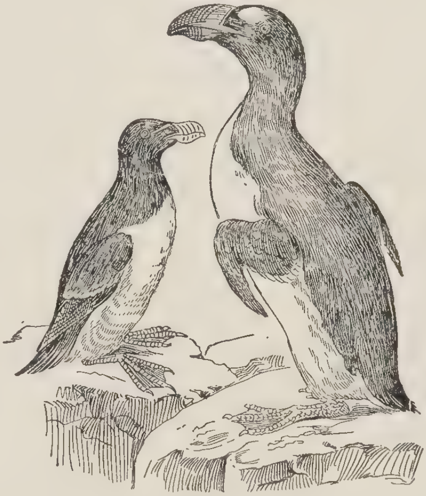
Antony defeated the army of the republic under Cassius and Brutus at Philippi in 42. The victors divided the Roman dominion among themselves, the west falling to Augustus, the east to Antony, and Africa to Lepidus, but Augustus and Antony soon secured absolute sway over the entire Roman world. Antony, while in Africa, gave himself up to luxury and dissipation, and estranged himself from the Romans on account of having made an alliance with Cleopatra. Augustus declared war against the queen largely with the intention of defeating her and Antony, and thus to secure complete control of Rome. In the celebrated naval battle at Actium in 31 B. C., Augustus gained a brilliant victory, and returned to Rome two years later to celebrate his triumph with much pomp and splendor. Though first named Octavius, his name had been changed to Octavianus, and now the senate bestowed on him the name *Augustus,* meaning the venerated or sanctified.

Once master of Rome, Augustus carried on successful wars in Gaul, Spain, Asia, and Africa, but later his general, Varus, was defeated by the Germans under Armenius with great loss. A period of peace now followed, and Augustus turned his attention to the improvement of internal affairs, particularly those of the capital, beautifying the city and constructing many highways to facilitate its commerce. It is said of him, "He found Rome of brick, and left it of marble," so extensive were his adornments and improvements. The period included in the reign of Augustus is one of the most important in Roman history, and is spoken of as the Augustan Age of Literature, being associated with such eminent patrons of learning as Virgil, Ovid, Cicero, Horace, and Catullus. The Roman people erected altars to his honor and changed the name of the month Sextilis to *Augustus,* now our August. Though his early life is marked by crafty traits of character, he displayed much generosity and liberality in the latter period of his reign. Leaving no direct heir, he was succeeded by his stepson, Tiberius, the son of Livia, whom he had married after she was divorced by her husband.

AUGUSTUS I., Frederick (Augustus II. of Poland), elector of Saxony and King of Poland, born at Dresden, Germany, May 12, 1670; died Feb. 1, 1733. In 1694 he succeeded his brother as elector of Saxony, and three years later was elected King of Poland, succeeding John Sobieski. He formed an alliance with Peter the Great against Charles XII. of Sweden, by whom he was defeated at Pultava and soon after renounced the crown of Poland. After the defeat of Charles XII. by the Russians, in 1709, Augustus was recalled to the crown of Poland. He was succeeded as elector of Saxony by his son, Augustus II.

AUGUSTUS II., Frederick (Augustus III. of Poland), elector of Saxony and King of Poland, born at Dresden, Germany, Oct. 7, 1696; died Oct. 5, 1763. He succeeded his father as elector of Saxony in 1733 and was chosen King of Poland by part of the nobility. In 1742 he concluded an alliance with Maria Theresa against Frederick the Great, who promptly invaded Saxony and captured Dresden. His misfortunes in the Seven Years' War caused him to become unpopular and he was obliged to flee to Poland. His son, Frederick Christian, succeeded him as elector of Saxony, and Poland chose Stanislas Poniatowski as king.

AUK (ạk), the name of several sea birds, including a large number of species, of which the great auk and the little auk are the best known. The great auk is about three feet high when sitting in an upright position. It has short wings, which are almost useless in flight, but they aid the bird to move with great rapidity in the water. At present it is found only in North America, but bones discovered in Denmark and other regions of Europe indicate that it was formerly common to Western Europe. The little auk is about the size of a large pigeon, and is met with in great numbers in the Arctic seas, where it nests in crevices of the bare rocks. The razorbill is allied to the auk, and like the great auk frequents the crannies of rocks. The young razorbills feed from the crop of the parents even after they are able to move about quite freely. Auks yield feathers of much value for bedding, for which purpose they are hunted with considerable persistency, while their flesh and eggs are eaten by the Eskimos and other peoples of northern regions. These birds migrate in early winter from the land to the open sea, where they float on the water or perch on the drifting ice.



GREAT AUK.

AURELIAN (ạu-rē'lĭ-an), **Lucius Domitius Aurelianus,** emperor of Rome, born in

Pannonia about 212; assassinated in 275 A. D. He was of humble origin, distinguished himself in the Roman army, and succeeded Claudius II., in the year 270, as emperor. He is noted chiefly for his gallant defenses of Rome against the Goths and the German tribes, particularly the Alemanni, and his defeat of Zenobia, Queen of Palmyra, then a magnificent city. He was a leader in many reforms, restored civil organization, and made extensive internal improvements. The senate conferred upon him the title of "The Restorer of the Empire." His assassination occurred while he was conducting an extensive expedition against the Persians.

AURELIUS (a̤u-rē'lĭ-us), **Antoninus Marcus,** Roman emperor and philosopher, known in history as Marcus Aurelius, born in 121; died March 17, 180 A. D. He is counted the crown and flower of Stoicism, the noblest of all pagans, and was the adopted son and the son-in-law of Antoninus Pius, whom he succeeded on the throne in 161. At the early age of seventeen he gained the favor of Emperor Hadrian. He was a pupil of Sextus, of the orator Herodes Atticus, and of Mecianus, an eminent jurist, through whom he formed the acquaintance of many learned men, and became an advocate of Stoic philosophy. He distinguished himself as sole commander of the army as early as 169, in which capacity he prosecuted with great vigor successive campaigns against the barbarians, and finally compelled them to sue for peace. Subsequently he conducted effective warfare in Asia, and, while in the East, visited Egypt and Northern Africa, and before returning home made an extended visit to Greece. On reaching Rome he was again compelled to take the field against new invasions of the savage Marcomanni and defeated the enemy several times, but was taken sick and died at Vindobona, now the city of Vienna. Although he possessed great liberality, a wide knowledge of philosophy, and magnanimity of character, he persecuted the Christians; not that he desired to suppress their worship, but rather that he feared their doctrines would hinder good government, and thought them enemies of the empire. While he was noted as a philosopher and wrote much on scientific subjects, the only work extant is one written in Greek, called "Meditations." This work has been translated into most modern languages and has had a wide circulation.

AURORA (a̤-rō'rȧ), the Roman personification of the dawn of day, known in Greek as the goddess Eos. The ancients regarded her the daughter of Hyperion and Theia, the wife of Astraeus, and the mother of the winds. She is sometimes represented in the act of ascending a chariot and throwing back the flowing veil, to indicate the opening of the gates of the morning.

AURORA, a city of Illinois, in Kane County, on the Fox River, about forty miles west of Chicago. It is on electric railways, the C. B. & Q., the C. & N. W., the C. M. & St. P. and other railways, and is the seat of important railroad shops. The manufactures include hardware, chemicals, flour, woolen and cotton goods, earthenware, machinery, and farming implements. Among the notable buildings are the post office, the Carnegie library, the high school, and the Jennings Seminary. The streets are handsomely paved with brick and asphalt, and improved by avenues of shade trees, electric lights, waterworks, and an extensive system of street railways. Population, 1900, 24,147; in 1920, 36,397.

AURORA, a city of Missouri, in Lawrence County, thirty-five miles southwest of Springfield, on the Kansas City, Fort Scott and Memphis and the Saint Louis and San Francisco railroads. The surrounding country is agricultural and fruit-growing, and has deposits of lead and zinc. It has a public library, waterworks, a fine high school, and a large trade in produce and merchandise. The manufactures include flour, cigars, clothing, and machinery. Population, 1900, 6,191; in 1920, 3,575.

AURORA BOREALIS (bō-rê-ā'lĭs), or **Northern Lights,** a phenomenon of great beauty in the northern hemisphere, corresponding to the phenomenon occurring in the southern hemisphere known as *Aurora Australis,* or Southern Lights, both being called Polar Lights. The lights are visible in autumn and winter, occurring at opposite times at the two poles, and are of utility in aiding to illumine the long nights. The shapes assumed by the lights are infinite in number and very transient, sometimes appearing of an ordinary flame color and sometimes assuming a greenish hue. The most frequent appearance is that of an arch of fire, from which great streamers flash towards the zenith, which range from a pale red or yellowish to a deep red color. Auroras are caused by the passage of electricity through the rarefied air of the upper regions of the atmosphere. This is proven by the fact that during the continuance of an extensive aurora telegraph wires give evidence of unusual disturbances in electrical action, and the magnetic needle is subject to frequent movements. It has been proven by tests that an effect similar to the aurora is produced by the passage of electric currents through rarefied gases.

AURUNGZEBE (ō-rŭng-zĕb'), the last emperor of the Mogul dynasty in India, called "Ornament of the Throne," born Oct. 22, 1618; died Feb. 21, 1707. His father, Shah Jehan, appointed him viceroy of the Deccan, where he acquired both wealth and military power. Dara, his eldest brother, succeeded to the throne in 1657, but Aurungzebe united with a younger brother in defeating Dara, and soon after treacherously put to death his brothers and their male descendants. He then assumed imperial power, imprisoned his political opponents, and extended the dominion until it included the entire peninsula of Hindustan. The reign of Aurungzebe was the most powerful and brilliant in the historic period of the Mogul dynasty in Hindustan, and he not only gave the country a secure government, but established mosques, built highways and bridges, founded hospitals, and patronized learning.

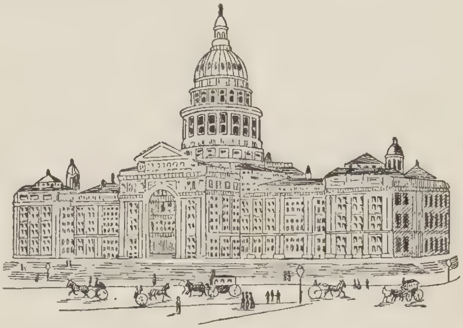
AUSCULTATION (ạs-kŭl-tā'shŭn), the art of discovering diseases within the body by means of the sense of hearing. It involves a knowledge of the natural sounds produced within the body in health and disease, especially those of the thorax and abdomen. An instrument used in this art, to facilitate investigation, is called a stethoscope.

AUSTEN (ạus'tĕn), **Jane**, novelist, born in Hampshire, England, Dec. 6, 1775; died July 18, 1817. She studied at the rectory of Steventon, where her father was rector, and in 1811 published anonymously the work entitled "Sense and Sensibility," a novel of considerable merit. Many of her novels are still widely read, being popular on account of their excellent and interesting style of description. Among her best known works are "Pride and Prejudice," "Mansfield Park," and "Northanger Abbey."

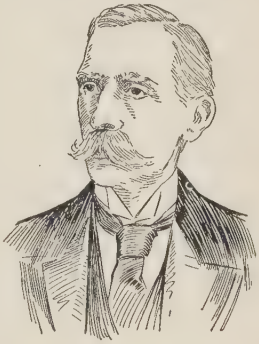
AUSTERLITZ (ạs'tĕr-lĭts), a small town in Moravia, in the northwestern part of Austria, twelve miles east of Brünn. It is celebrated on account of Napoleon's victory over the Austrians and Russians on Dec. 2, 1805. After Napoleon occupied Vienna, his headquarters were fixed at Brünn, to which place the allied armies advanced. The French army numbered about 80,000, and in the battle lost 12,000 men; while the allied forces numbered 84,000, and sustained a loss of nearly 30,000 men in killed, wounded, and prisoners. This battle resulted in the peace of Pressburg, and a large part of Central Europe became subject to Napoleon. In 1921 Austerlitz had a population of 3,980.

AUSTIN (ạs'tĭn), a city in Minnesota, county seat of Mower County, on the Red Cedar River, about 100 miles south of Saint Paul. It is situated on the Chicago Great Western and the Chicago, Milwaukee and Saint Paul railroads, and is surrounded by a fertile farming country. The chief buildings include the county courthouse, the high school, the Carnegie library, and the Southern Minnesota Normal College. It has municipal waterworks and manufactures of flour, machinery, and farming implements. The first settlement was made in 1854 and it was incorporated in 1873. Population, 1905, 6,489; in 1920, 10,118.

AUSTIN, the capital of Texas, county seat of Travis County, on the Colorado River, about 180 miles northwest of Houston. It is on the International and Great Northern, the Houston and Texas Central, and the Austin and Northwestern railroads. The city is surrounded by a fertile farming region, which produces large quantities of cereals, fruit, and live stock, and is important as a market for produce and merchandise. It has electric lights, electric street railways, waterworks, sewerage, and pavements of stone and macadam. The State Capitol building, located on Capitol Hill and built of Texas granite, is one of the finest structures of the kind in America. Austin has a large number of State and county buildings, a fine public school system, numerous churches, and several educational and scientific associations. It is the seat of the Austin Military Institute, the Texas State University, a Roman Catholic academy, and several benevolent institutions. The manufactures embrace clothing, machinery, flour, chili, truck bodies, and farming implements. The city was named in honor of Stephen F. Austin (q. v.). It became the capital of the Texan Republic in 1839, and in 1850 was made the capital of the State. Population, 1900, 22,258; in 1920, 34,876.


STATE CAPITOL, AUSTIN.

AUSTIN, Alfred, poet, born in Headingley, near Leeds, England, May 30, 1835. He graduated at the University of London in 1853 and four years later was called to the bar. His father died in 1861, after which he traveled extensively and devoted his attention to literature. In 1896 he became poet laureate of England. As a critic he wrote in an interesting manner and with much originality. His "The Poetry of the Period" is an essay that contains criticisms on Browning and Tennyson. His chief works are "Songs of England," "Savonarola," "A Tale of True Love and Other Poems," "England's Darling," "In Veronica's Garden," "English Lyrics," "Haunts of Ancient Peace," and "A Lesson in Harmony." He died June 2, 1913.


ALFRED AUSTIN.

AUSTIN, John, jurist, born at Creeting Mill, England, March 3, 1790; died in 1859.

He studied law in London and was a friend of John Stewart Mill. In 1826 he was made professor of jurisprudence in the University of London, where he taught with much success for a term of six years. He takes rank as one of the most distinguished of English writers on jurisprudence. His chief work is "Province of Jurisprudence Determined."

AUSTIN, Stephen Fuller, pioneer, born in Wyeth County, Virginia, in 1793; died Dec. 27, 1836. He was a son of Moses Austin, who projected a colony in Texas. In 1821 he located on the site of the present city of Austin, Tex., and in 1833 joined a number of colonists who held a convention to organize a separate State government under Mexican authority. A revolution in Mexico defeated the purpose of the convention, and he soon joined the revolutionists and commanded a small army. In 1835 he went as commissioner to Washington to obtain recognition of Texas as an independent State by the United States government, and died soon after returning to Texas.

AUSTRALASIA (ạs-tral-ā'shĭ-ȧ), a division of Oceanica, located southwest of Asia. It comprises the continent of Australia and the islands adjacent to it. Among the chief islands of Australasia are New Zealand, Tasmania, New Caledonia, the Solomon Islands, the New Hebrides, New Britain, New Ireland, Admiralty Islands, the Arru Islands, New Guinea, and many smaller islands and island groups. It comprises the largest of the three portions of Oceanica, the other divisions being Polynesia and Malaysia. The area of Australasia is 3,259,200 square miles, and the population is estimated at 5,275,000.

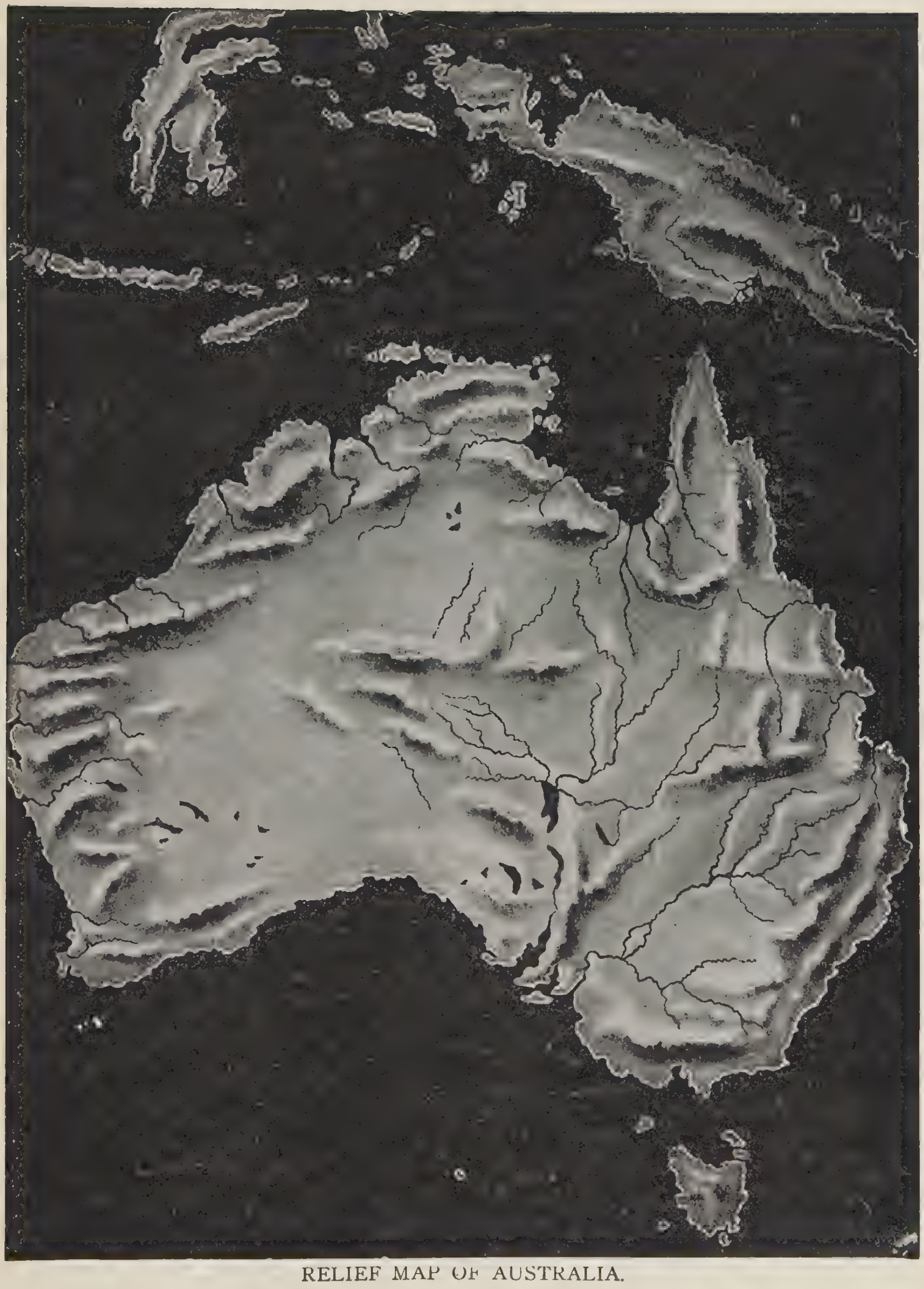
AUSTRALIA (ạs-trā'lĭ-ȧ), the smallest of the six continents, located southeast of Asia and the East Indies. The eastern shore is washed by the Pacific, and the southern and western by the Indian Ocean. Its greatest length from east to west is nearly 2,500 miles, the greatest breadth from north to south is about 2,000 miles, and the area, including Tasmania, is 2,974,581 square miles. The coast line is quite regular, but many islands dot the adjacent waters, except toward the southwest, where the sea is open. The most important identations include Queen's Channel and the Gulf of Carpentaria on the north, Spencer Gulf and the Great Australian Bight on the south, and Shark's Bay on the west. South is the island of Tasmania, separated from the continent by Bass Strait, and southeast is New Zealand. Torres Strait separates Australia from New Guinea and in the same vicinity, off the northern shore, are Arafura Sea, Timor Sea, and Coral Sea. North of it is the great island group that extends southwest of Asia, which includes New Guinea, Java, and Borneo, and many other islands and groups of islands dot the sea lying north. Toward the northeast is the Great Barrier Reef, a chain of coral islands and reefs extending a distance of 1,260 miles. The continent is divided by the tropic of Capricorn, though the greater portion lies south of that line, but it extends only to about 39° south latitude. Hence, the northern portion is located in the Torrid Zone and the southern part is in the South Temperate Zone.

PHYSICAL FEATURES. The interior of Australia is formed largely of sandy hillocks or plains, which are covered with coarse grass or brushwood. It is generally arid and hot, though at different seasons occur heavy rains and hail storms, when shallow lakes form in the depressions, to which the water is carried by inland streams. As the waters from these lakes evaporate they become brackish or salty, some yielding considerable quantities of saline products. Along the eastern coast trend the Australian Alps, which are highest in the southeast, where Mount Kosciusko, about 7,000 feet high, forms the culminating peak of the Australian continent. In Victoria these mountains are known as the Australian Alps, or the Liverpool Range. Besides these mountains are various smaller chains and groups, most of which are in the interior and along the western shore. Low plains make up a large part of the surface along the southern and northern coasts.

The Murray, which rises on the west side of the Australian Alps, is the largest stream and has a basin of about 300,000 square miles. It receives the drainage from the Darling and the Murrumbidgee rivers, and discharges into the Indian Ocean, near Adelaide. In the north is the Victoria, in the west the Murchison, and in the interior is the Cooper, which flows into Lake Eyre, a salt-water lake that has no outlet to the sea. A large number of rivers in the interior discharge into salt lakes and are of no service as means of communication, but may be utilized for irrigation purposes. In the central part is Lake Amadeus, in the south are lakes Eyre, Gairdner, and Torrens, and in the western part is Lake Austin. Most of the interior lakes have no connection with the ocean and their waters are quite brackish and salty.

The climate is naturally hot and dry, but along the sea coast it is modified by healthful and pleasant sea breezes and rains, thus making large areas agreeable and productive. On the eastern and southern slopes the sea winds carry an abundance of moisture, and these regions are the most productive and densely populated. The temperature at Melbourne averages about 56°, at Sidney about 63°, and at Palmerston, in the northern part, about 80°. In the interior the mean annual temperture ranges from 60 to 80°, and the climate is characterized by great changes owing to excessively hot winds.

VEGETATION. The soil of Australia, though arid and sandy in the interior regions, is as a whole quite fertile, and yields an abundance of vegetation in all districts that have an ade-



RELIEF MAP OF AUSTRALIA.

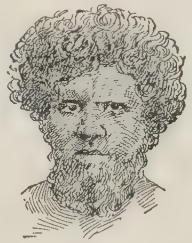
quate quantity of rainfall. Many distinctive types of plants thrive and range from the tropical luxuriance of the moist east and north coasts to the arid interior, where vegetation is scant and the species are peculiarly adapted to endure excessive drought. Tree ferns, canes, palms, and bamboos thrive in the northeastern part, and here the forests contain many orchids and other parasitic plants. The bottle tree and the grass tree thrive here, and in the southeastern part, especially in Victoria, are the eucalyptus, acacia, fan palm, honeysuckle, and paper-bark tree. The gum-trees are very numerous and more than 150 species abound, and there are fine forests of she oak and other valuable woods. Not only are the forests of the eastern section beautiful, but both here and on the fertile plains are luxuriant growths of grasses and flower-bearing vegetation. The steppes of the interior take on summer verdure where rain is sufficient, and in the western part the country is alternated with forests and prairies, though large tracts of Western Australia are arid and vegetation is scant. Cereals, vegetables, and tropical fruits thrive abundantly.

MINERALS. Gold is the most important mineral and was discovered in 1823, but mining was not developed on an extensive scale until 1851, when prospectors and miners in large numbers came to the country. The most productive fields are in the mountains of Eastern Australia. Victoria produced about two-thirds of the output, though the productions of Queensland and New South Wales were considerable. Copper is mined in South Australia and other states, and silver is obtained in paying quantities both in Australia and in Tasmania. Other minerals more or less abundant are coal, mercury, iron, antimony, zinc, bismuth, diamonds, and manganese. Granite and building stone are abundant.

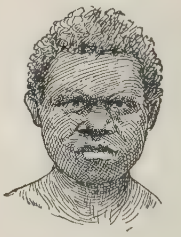
ANIMALS. The continent possesses no large animals, the largest being the kangaroo, of which a number of species abound. The *marsupialia* or pouch mammals, which include the kangaroo, are represented by 30 species, and the *monotremata,* or egg-laying mammals common to Australia, include the spiny ant-eater and the platypus or water mole. The last mentioned reproduces from eggs and is confined to Australia. Among the flesh-eating animals are the rat, the mouse, and the native cat, and the insect eaters include the bandicoots. The kangaroo, the rock wallaby, and the hare kangaroo are the chief grass eaters. It is thought that the *dingo,* or wild dog, though sometimes classed as a native of Australia, is a descendent from the domestic dog. Bats are very numerous and the rabbit, which has been naturalized from Europe, has become a pest because of its rapid increase. Most of the animals are small and the fur-bearing species are limited, but the continent is especially rich in birds of song and plumage. Here thrive the tue, emu, owl, parrot, brush turkey, crested pigeon, lion bird, oriole, jackass, cockatoo, crowned pigeon, parrakeet, and bird of paradise. The species of poisonous snakes are numerous, which is true of the lizards, frogs, and fish. Insect life is not well represented, though the species of butterflies, ants, bees, and beetles are quite numerous.

GOVERNMENT. The entire continent is a colonial possession of Great Britain. For the purpose of government it is divided into five states. The eastern section comprises the three states of Queensland, New South Wales, and Victoria; the central part is embraced in South Australia, which includes the Northern Territory; and the western part is the State of Western Australia. These five states, including Tasmania, are organized as the Commonwealth of Australia. See **Australia, Commonwealth of.**

INHABITANTS. The population of Australia, including Tasmania, in **1921,** was 4,872,059. This number included **about 60,000** natives **and 40,000** Chinese. Fully one-third of the inhabitants are of foreign birth, of whom a large majority came from the United Kingdom and about 50,000 from Germany. The aborigines are the lowest of the human races as regards intelligence and are of the Negroid type, resembling those of Africa. They are indolent, but peaceful, and engage largely in hunting and fishing. Some regard them incapable of being civilized and educated, and there has been a steady decrease in number for the past forty years. In color they are dark brown or black, have straight or wavy hair, sometimes curly, and are of medium size and inferior muscular strength. The favorable climate has not required them to provide for heavy clothing or substantial shelter, hence they live in illy constructed huts and subsist on insects, reptiles, roots, and the native animals. Little, if any, development was made in their habits or modes of living since Australia has been occupied by Europeans, though some engage in light work for short periods of time when they are in need or want. They are skillful with the boomerang and spear, are fond of dogs, and still employ wooden axes and stone hatchets in cutting wood and building their huts.

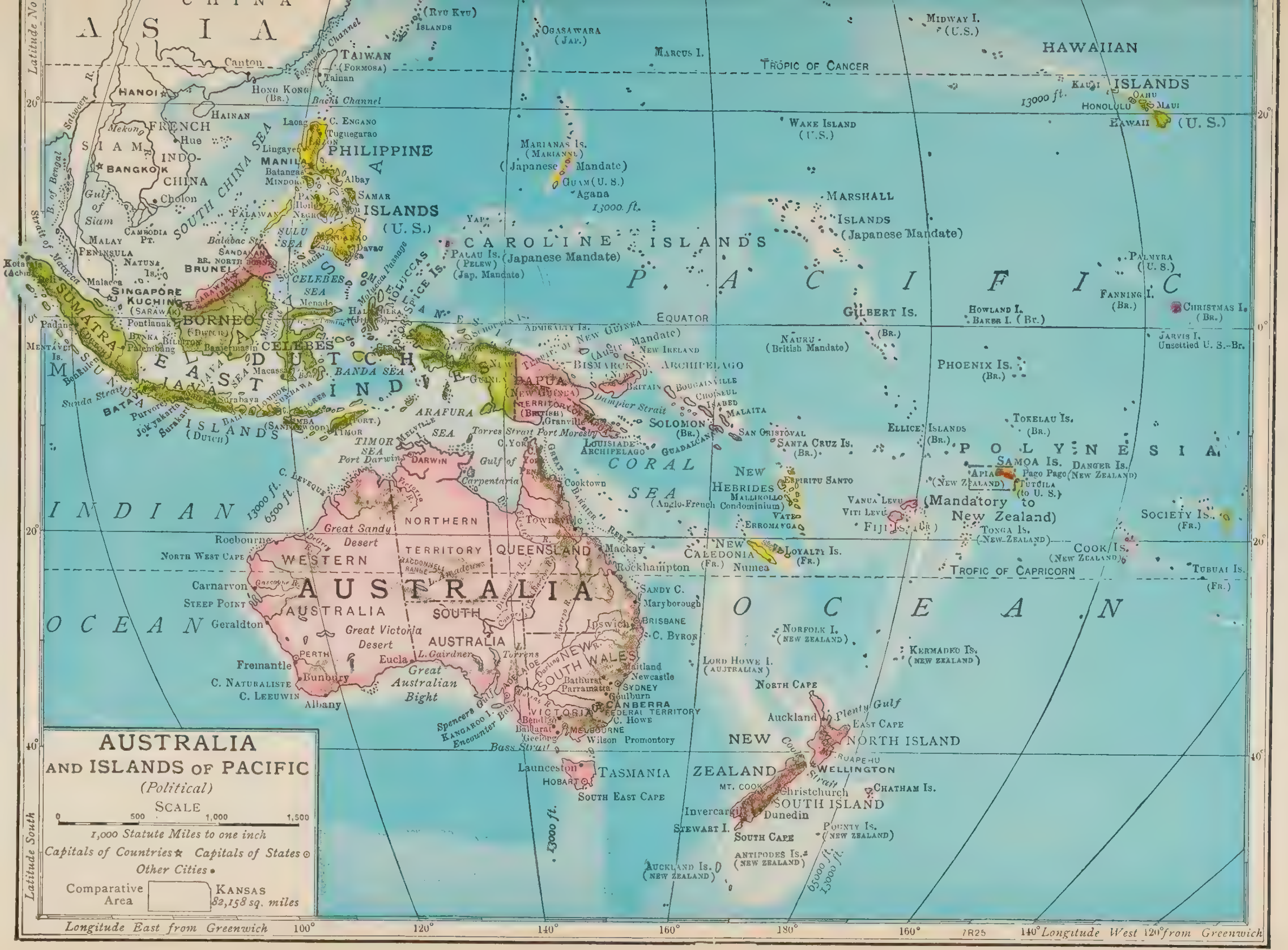


AUSTRALIAN.



MELANESIAN.

HISTORY. Australia was first discovered by Europeans about the middle of the 16th cen-


A S I A
CHINA
Canton
HANOI
HONG KONG (BR.)
HAINAN
FRENCH INDO-CHINA
Hue
SIAM
BANGKOK
Cholon
Gulf of Siam
MALAY PENINSULA
Malacca
SINGAPORE
KUCHING (SARAWAK)
BRUNEI
SUMATRA
BORNEO
JAVA
CELEBES
DUTCH EAST INDIES
BANDA SEA
ARAFURA SEA
TIMOR SEA
PHILIPPINE ISLANDS (U. S.)
MANILA
SOUTH CHINA SEA
SULU SEA
CELEBES SEA
TAIWAN (FORMOSA)
(RYU KYU) ISLANDS
OGASAWARA (JAP.)
MARIANAS IS. (MARIANNE) (Japanese Mandate)
GUAM (U. S.)
Agana
CAROLINE ISLANDS (Japanese Mandate)
PALAU IS. (PELEW) (Jap. Mandate)
MARCUS I.
WAKE ISLAND (U.S.)
MARSHALL ISLANDS (Japanese Mandate)
TROPIC OF CANCER
MIDWAY I. (U.S.)
HAWAIIAN ISLANDS (U. S.)
KAUAI
OAHU
MAUI
HONOLULU
HAWAII
13000 ft.
P A C I F I C
PALMYRA (U. S.)
FANNING I. (BR.)
CHRISTMAS I. (BR.)
JARVIS I. Unsettled U. S.-Br.
EQUATOR
GILBERT IS. (BR.)
HOWLAND I.
BAKER I. (BR.)
NAURU (British Mandate)
PHOENIX IS. (BR.)
ELLICE ISLANDS (BR.)
TOKELAU IS. (BR.)
P O L Y N E S I A
SAMOA IS.
APIA
Pago Pago
TUTUILA (to U. S.)
(NEW ZEALAND)
(Mandatory to New Zealand)
DANGER IS. (NEW ZEALAND)
SOCIETY IS. (FR.)
COOK IS. (NEW ZEALAND)
TUBUAI IS. (FR.)
TONGA IS. (NEW ZEALAND)
FIJI IS. (BR.)
VANUA LEVU
VITI LEVU
TROPIC OF CAPRICORN
NEW GUINEA
PAPUA
TERRITORY OF NEW GUINEA (AUSTL. MANDATE)
BISMARCK ARCHIPELAGO
NEW IRELAND
NEW BRITAIN
ADMIRALTY IS.
BOUGAINVILLE
CHOISEUL
ISABEL
MALAITA
GUADALCANAL
SAN CRISTOVAL
SOLOMON IS. (BR.)
SANTA CRUZ IS. (BR.)
LOUISIADE ARCHIPELAGO
Port Moresby
Torres Strait
NEW HEBRIDES (Anglo-French Condominium)
ESPIRITU SANTO
MALLIKOLLO
VATE
ERROMANGA
NEW CALEDONIA (FR.)
Numea
LOYALTY IS. (FR.)
CORAL SEA
GREAT BARRIER REEF
AUSTRALIA
WESTERN AUSTRALIA
NORTHERN TERRITORY
QUEENSLAND
SOUTH AUSTRALIA
NEW SOUTH WALES
VICTORIA
FEDERAL TERRITORY
CANBERRA
DARWIN
Port Darwin
Gulf of Carpentaria
C. York
Cooktown
Townsville
Mackay
Rockhampton
Maryborough
BRISBANE
Ipswich
C. Byron
Maitland
Newcastle
SYDNEY
Parramatta
Bathurst
Goulburn
MELBOURNE
Geelong
Ballarat
Bendigo
ADELAIDE
PERTH
Fremantle
Bunbury
Albany
Geraldton
Carnarvon
Roebourne
Great Sandy Desert
Great Victoria Desert
Eucla
L. Gairdner
Torrens
Great Australian Bight
Spencers Gulf
Kangaroo I.
Bass Strait
TASMANIA
Launceston
HOBART
SOUTH EAST CAPE
LORD HOWE I. (AUSTRALIAN)
NORFOLK I. (NEW ZEALAND)
KERMADEC IS. (NEW ZEALAND)
NEW ZEALAND
NORTH ISLAND
SOUTH ISLAND
Auckland
WELLINGTON
Christchurch
Dunedin
Invercargill
NORTH CAPE
EAST CAPE
Plenty Gulf
Cook Strait
MT. COOK
STEWART I.
SOUTH CAPE
CHATHAM IS.
BOUNTY IS. (NEW ZEALAND)
ANTIPODES IS. (NEW ZEALAND)
AUCKLAND IS. (NEW ZEALAND)
INDIAN OCEAN
O C E A N
Longitude East from Greenwich
100°
120°
140°
160°
180°
160°
140° Longitude West 120° from Greenwich
Latitude North
Latitude South
20°
0°
20°
40°

AUSTRALIA
AND ISLANDS OF PACIFIC
(Political)

SCALE
0 500 1,000 1,500
1,000 Statute Miles to one inch

Capitals of Countries ★ *Capitals of States* ⊙
Other Cities ●

Comparative Area KANSAS *82,158 sq. miles*

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tury, probably about 1531. In 1542 the Portuguese published an account of a number of explorations and about that time the continent became known to explorers of different nations. Manoel Godinho de Eredia, a Portuguese navigator, in 1601, set foot upon the continent and explored a part of its coast. The Dutch sent an expedition from Bantam, in Java, in 1605, and explored a part of the northern coast lying immediately south of New Guinea. In 1606 a Spanish expedition under Luys Vaez de Torres, from whom Torres Strait was named, sailed through the narrow neck of water between New Guinea and Australia. Several expeditions sailed under Dutch navigators from Java in 1616, and named the continent New Holland. They surveyed a large portion of the northwest coast, where they planted several settlements.

In 1770 Captain James Cook sailed by way of New Zealand and landed on the eastern coast of Australia, surveyed and explored a number of localities, and took possession for England. He named the region New South Wales. An English settlement was made at Botany Bay, near Sydney, in 1788, where a penal station was established for convicts transported from England by the government. Fully 150,000 convicts were taken to Australian stations, and about the same time settlers began to occupy the coasts and to press inland. The mountains were not crossed until 1813, when it was thought a great inland sea stretched far toward the west, and in 1847 the German explorer, Ludwig Leichhardt, started with a small company from Moreton Bay to cross the continent, but was not heard of again. Immigration and development began with the discovery of gold in 1851, and since that time there has been constant progress in the material industries and the growth of cities. The government was administered under the jurisdiction of the five colonies of Victoria, Queensland, New South Wales, South Australia, and Western Australia, until Jan. 1, 1901, when Tasmania joined them to form the Federal State known as the Commonwealth of Australia, which see.

AUSTRALIA, Commonwealth of, a colonial possession of Great Britain, consisting of Tasmania and the five federated states of Australia. The area, population, and natural resources are treated in the article entitled Australia and additional information is given under Tasmania, which see.

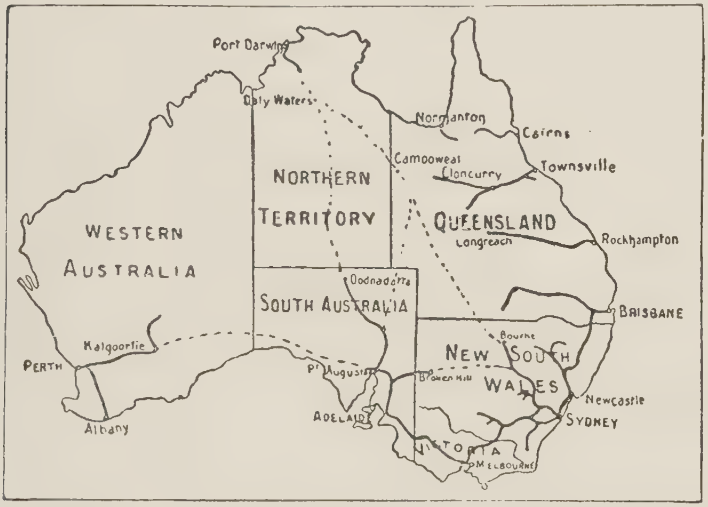
Agriculture. Both farming and stock raising began to be developed as early as settlements were made, but the latter enterprise received the larger share of attention. Agricultural products thrive abundantly where the rainfall is sufficient to germinate and mature crops, and in many sections of the interior arid lands have been redeemed for cultivation by irrigating ditches and canals which draw a supply of water from rivers and mountain streams, and in some localities artesian wells are utilized successfully. Victoria holds first rank in the number of acres under cultivation, but is followed closely in this respect by South Australia and New South Wales. Tasmania has a larger area of cultivated land than Western Australia, but is surpassed in the acres under cultivation by Queensland. Wheat is the most important cereal product and is grown on about half of the total acreage, and hay takes second rank in the value of the quantity produced. Other crops are corn, barley, oats, sugar cane, potatoes, and tropical and semitropical fruits. Development in fruit raising has been constant, especially in the cultivation of grapes, bananas, peaches, and apples. Coffee is grown successfully on the coast of Queensland, and development in silk culture has stimulated attention in growing the mulberry.

Sheep raising has received the larger attention, though it is by no means the only animal industry. In the number of head of sheep, Australia surpasses all of North America, having about one hundred million head, and the annual production of wool aggregates about five hundred million pounds. The favorable climate and the extensive area of grazing lands account for large interests in sheep growing, and the quality of both wool and mutton is of a high class. Cattle are grown profitably for beef and dairy products. Horses are reared both for domestic use and for exportation. Goats, mules, poultry, and bees yield good returns.

Mining. The discovery of gold in 1851 stimulated immigration, and from that time mining has continued to be an industry of much importance. The first mines were opened in New South Wales, but development was made soon after at Ballarat, Victoria, and in different parts of Queensland. The Coolgardie district of Western Australia and the fields of Tasmania were open more recently. Victoria had a larger output of gold up to 1899 than all the other states combined, but the production is now greatest in Western Australia. The annual output of gold is about $56,500,000 and of silver about $16,150,000. Iron ore is abundant in the mountains and there are extensive deposits of bituminous coal, particularly in New South Wales. Tin and copper are mined profitably especially in Tasmania, and there is a small output of antimony, bismuth, lead, and diamonds.

Transportation. As the commonwealth has no large lakes and few streams that can be navigated, transportation is dependent almost exclusively upon the construction of highways and the building of electric and steam railways. The government owns and operates most of the railroads of the continent and Tasmania, and less than 900 miles of lines are managed under private ownership. In 1923 the total railroad mileage was 26,500 miles, of which about 600 miles were in Tasmania. All the principal cities and many interurban points have electric lines, and macadamized highways have been constructed and are maintained largely by local authority. Several telegraph lines extend across the continent, both north and south, and cable lines connect the chief port cities with all countries of the world.

COMMERCE. The trade with foreign countries is very large, especially in raw materials. Manufacturing enterprises have not been developed as extensively as mining and agriculture, and are confined principally to products used in domestic consumption. They consist chiefly of textiles, utensils, clothing, machinery, and food products, hence large quantities of the commodities produced are exported and many supplies are obtained by importation. Though smaller in the number of inhabitants than Canada, it has a larger export and import trade. The duties collected are uniform throughout the commonwealth. Great Britain has the largest share of the foreign trade, about eighty per cent., and next in order are the United States, Germany, and France.



Map showing the proposed Transcontinental Railways of Australia.

EDUCATION. The state of education is improving perceptibly, owing to a reasonable enforcement of the compulsory school attendance law in all the states. In 1860 sixteen per cent. of the people were illiterate, but at present illiteracy is placed at 8 per cent., each decade showing a satisfactory improvement in public instruction. Besides public schools and numerous academies and colleges, there are universities supported by the states at Adelaide, Sydney, Hobart, and Melbourne. The educational institutions are coeducational and are modeled after the English universities at Manchester and Liverpool. English is the spoken language, and the social and industrial conditions of the regions fairly developed are quite similar to those of Canada and the United States. In religion there is no restriction, and numerically the Episcopal church is the strongest. Other denominations represented by large numbers are the Presbyterians, Roman Catholics, and Lutherans.

GOVERNMENT. The commonwealth is governed under a constitution which went into effect in 1901. This constitution delegates to the central government all power not reserved by the state, and is modeled upon that of the United States rather than upon the constitution of Canada, in that it does not provide for a strongly centralized state. The governor general is appointed by the sovereign of Great Britain, is assisted by a ministry made up of members of Parliament, and has the power to summon and dissolve Parliament, which is made up of two branches, a senate and house of representatives, and is required to meet every year. Each state has six senators, elected for six years. The membership in the house, chosen for three years, is twice as large as the number of senators, and any state cannot have less than five representatives in the lower house. The judicial department culminates in a high court of justice, to which appeals may be taken from the Federal court, from the interstate commission, and from the supreme court of the Federal states, and the acts of the highest court is subject to review by the British Privy Council, though only in questions pertaining to the constitutional powers of the different states or of the commonwealth. Local government is vested in counties and municipalities, both politically and educationally, and the right of suffrage is in all citizens regardless of sex and cannot be restricted by the Federal Parliament. At present the house of representatives has a membership proportiond as follows: Western Australia, 5; Tasmania, 5; South Australia, 7; Queensland, 9; Victoria, 23; and New South Wales, 26.

Canberra, in New South Wales, was chosen for the capital in 1903. Brisbane, Adelaide, Sydney, Melbourne, and Hobart are the largest cities. In 1920 the area and population were given as follows:

	AREA.	POPULATION.
Tasmania	26,215	191,214
West Australia	975,920	288,483
South Australia	903,690	409,997
Queensland	670,500	614,500
Victoria	87,884	1,315,747
New South Wales	310.372	1,648,746
Total	2,974,581	4,468.687

AUSTRALIAN BALLOT (ạs-trā'lĭ-an), a ballot first used in elections held in New South Wales, in 1858, and subsequently in all the subdivisions of Australia. It has been modified more or less and adopted in many countries. In some form it is in use in nearly all the states and countries where the elective franchise is recognized. The main features are that ballots used in voting are printed at public expense, the different party tickets are printed on the ballots, and each voter is supplied with one copy when he presents himself at the polls to vote. There is a legal provision against electioneering near the polls, and secrecy in voting is guaranteed by prohibiting an elector, under suitable penalty, from exhibiting the ballot to any one after it is marked. Separate voting booths are provided in which the voter must by himself mark and prepare his own ballot, if he is capable to do so, otherwise it may be marked at his direction by two of the judges, who must belong to different parties, after which it is handed to the proper officer, by whom it is deposited in the ballot box. The system is universally popular, and has tended to preserve both the secrecy and sanctity of the ballot.

AUSTRIA (ôs'trĭ-ȧ), a country of Europe, formerly a part of Austria-Hungary. The Republic of Austria was proclaimed in 1918, after the revolution following the World War, and the present constitution was adopted in 1920. As at present constituted, the area is 32,396 square miles. It is divided into the nine provinces of Vienna, Lower Austria, Upper Austria, Carinthia, Salzburg, Styria, Tyrol, Vorarlberg, and Burgenland. The last mentioned was transferred to Austria in 1921. In 1928 the population was 6,580,500.

Description. The region embraced in Austria-Hungary included three great mountain systems, which, in the northwestern part, assume elevations very similar to the mountainous regions of Switzerland. In the northern part trend the Carpathian and Moravian Mountains; in the southern part are the Transylvanian Alps, which form a part of the boundary with Rumania; and along the Adriatic shores are the Austrian Alps. The Carpathians are connected by the Moravian Mountains with the Bohemian Highlands, which embrace the Riesen-Gebirge, the Böhmerwald, and the Erzgebirge. The Austrian Alps extend from Switzerland to the Danube and embrace the Rhaetian, the Noric, and the Dinaric Alps, and their highest peak, Ortler Spitze, has an elevation of 12,800 feet above the sea. The Carpathian Mountains are less elevated, ranging from 3,000 to 8,700 feet and culminating in the Gerlsdorfer Spitze, which is 8,735 feet high. Fine scenery and numerous caverns and mineral springs abound in the highlands, making some sections the most picturesque regions of Europe.

The drainage is almost exclusively to the southeast by the Danube and its tributaries, which include the Drave, the Theiss or Tisza, and the Save rivers. In the northern part is the Moldau, a tributary of the Elbe, while the Dniester traverses part of Galicia, and the Vistula forms part of the boundary between Galicia and Russian Poland. Other streams include the Adige, the Inn, and the Raab. Although Austria-Hungary was classed as an interior country of Europe, it had about 500 miles of sea coast along the Adriatic. Lake Balaton, in Hungary, is the most important inland water, but numerous small lakes diversify and add beauty to the mountain scenery.

The uneven surface of the country causes it to have considerable diversity in climate. In the western part the rainfall is very abundant, about 100 inches annually, and in Moravia and Silesia it is not more than 25 inches, being limited on account of high altitudes causing precipitation before the moisture is carried to that section by the clouds. However, there is sufficient rainfall in all parts for the successful cultivation of plants adapted to the different temperatures. At Vienna the mean average temperature is about 50°, and in the southern part of Dalmatia, at Ragusa, it is 62°.

Animals. The native animals are like those found in most of central Europe, but the number and kind have been limited by the fact that the country has been populated for centuries. In the mountains, especially in the Alps, are a considerable number of ibex and chamois. Wolves, bears, lynxes, and other species are met with in considerable numbers. The fisheries of several small lakes and of the larger streams yield sturgeon and other commercial fish. Birds of song and plumage are abundant. The domesticated animals consist of those common to European countries. Horses and sheep are not reared as extensively as in former years, but cattle are grown in large numbers for beef and dairy products. Goats are reared for their flesh and skins, and sheep are grown in all parts of the country, but receive special attention in Tyrol. Bee-keeping and silk culture are important enterprises and yield large returns.

Agriculture. Agriculture is the chief occupation, fully three-eighths of the people engaging in that enterprise. Austria is noted for its production of cereals but imports large quantities of foodstuffs annually. Oats, potatoes, rye, barley, and wheat are grown on a large acreage, and interest in the culture of corn, buckwheat, and millet is extensive. The sugar beet, tobacco, flax, and fruits are grown. Among the chief orchard products are grapes, oranges, apricots, chestnuts, almonds, apples, and figs. Sugar is produced extensively, though not enough for domestic consumption.

Minerals. Mining has been an important enterprise in some parts of the country for centuries, and there are traces of mines worked by the Celts and Romans. Almost every known mineral is found, and considerable deposits of clays, building stones, and useful earths exist in paying quantities. Austria was deprived of its rich salt mines in Galicia, but still has salt deposits which are controlled by the government. Salt is also derived from evaporating the waters of salt springs. Gold is produced in small quantities. Lignite and anthracite coal are mined, a total of 150,000 tons anthracite and 3,120,000 tons lignite. Other mine products include silver, iron ore, copper, lead, zinc, gypsum, antimony, and manganese.

MANUFACTURING. The last few years have witnessed a marked advance in the manufacturing enterprises of the republic. This industry has been encouraged by the government through a reduction of freight rates on state railroads in favor of manufacturers and by bounties paid to aid new enterprises. The clothing industry is developed to a high extent in the western part, which is true also of the manufacture of textiles, articles of food, building materials, and steel and iron. Austria holds high rank in the manufacture of glass. Austrian art ware is seen in large quantities at international expositions and sold extensively in all civilized countries. Vienna has the largest milling enterprises of Austria, taking rank in the output of flour with other European cities. Beet sugar, pottery, machinery, earthenware, firearms, and dairy products are among the important industrial products.

COMMERCE. The country has limited commercial interests, the imports exceeding the exports. A merchant marine is aided and encouraged by the government, though the loss of the coast line on the Adriatic prevents the country from taking rank with the nations more fortunately situated. Only 15 per cent. of the entire foreign commerce is carried by water, the remainder going by land, either to be consumed in Europe or shipped to foreign countries from ports located outside of the republic. Wheat, fruit, flour, sugar, earthenware, leather, clothing, and minerals are the chief articles of export. Fully three-fourths of the trade is with Germany, and the nations coming next in order are Italy, Great Britain, Rumania, and Russia. The trade with American countries is not large.

TRANSPORTATION. Railroad building did not receive attention until 1837, when a short line was built in Austria. The government nationalized the railways in 1846, since which time most of the lines have been owned and operated as public property. In 1927 the total railroad mileage was 4,115 miles, exclusive of electric lines, which have been constructed on a large scale in the principal cities and through many sections of the country. Transportation by water is promoted from ports on several canals and on the Danube, which is navigable by steamboat throughout the course and furnishes a direct outlet to the Black Sea. Communication by telephone and telegraph lines is ample.

EDUCATION. Public education has received much encouragement. There are districts in which illiteracy has been almost entirely overcome and the state of education ranges from 97 to 99 per cent. The highest intellectual culture of the people prevails throughout the provinces. Compulsory school attendance laws have long been in force, and all children from six to twelve years inclusive are required to attend school. The system of schools is modeled after that of Germany, and embraces the *gymnasia,* the *realschulen,* and the higher institutions. The elementary schools take high rank, and the interweaving of practical education with the common school studies is an objective point. Articulated with the common schools is a system of academies and colleges, and there are various schools devoted to commerce, agriculture, music, and arts, besides a number of well-equipped universities. The country has excellent universities, situated, respectively, in the cities of Vienna, Gratz and Innsbruck. These institutions embrace courses in theology, political economy, law, medicine, philosophy, engineering, and other lines of higher work. Twelve theological colleges are maintained, of which ten are Roman Catholic. Roman Catholic is the prevailing religion, but all forms of religious worship are permitted. The denominations taking rank numerically next to the Roman Catholics are the Orthodox Greek, Protestants, Armenians, and Jews.

INHABITANTS. The people were greatly diversified in races and languages, and in this respect the monarchy resembled Russia. About two-fifths were German, while the remainder were either of Germanic, Slavonic, Magyar, Latin, or Hebrew origin. In Hungary the Slavs and the Magyars predominated and the Slavic and Hungarian languages were spoken. German is the language of the Austrian republic, and the people are almost entirely German. Vienna, the capital of Austria and formerly of the dual monarchy, is one of the largest and finest cities of Europe. Other cities of importance include Salzburg, Gratz, Linz, Villach, Baden, Innsbruck, Klagenfurt, Steyr, St. Pölten, and Wiener-Neustadt. In 1910 the population of the empire was 51,314,271, of which number 28,567,898 were in Austria; 20,850,700, in Hungary; and 1,895,673, in Bosnia and Herzegovina. The total population, in 1917, was 51,602,565.

DEFENSE. Austria-Hungary long ranked as one of the great military powers, being classed among the most powerful modern nations of Europe. The military service was placed on a basis requiring universal service in 1889, and the armed forces comprised the navy, army, landwehr, and landsturm. All able-bodied citizens of the empire were required to serve in the army three years, beginning at the age of twenty, or in the navy four years, but they were not released after such service until they had had additional practice or training for a period ranging from three to twelve years. The peace footing was 380,786 men and officers. There was a war footing of about 2,000,000 men, but in cases of emergency fully double that number of reasonably well-trained soldiers could be placed at the disposal of the monarch. The navy consisted of about 140 vessels, including twenty armored battleships, and 170 torpedo boats. The military forces were equipped with the most modern arms. Austria has been reduced as a military power. It has an army of 30,000 men.

GOVERNMENT. The former dual government was adopted by the *Ausgleich* of 1867, under which the ruling sovereign was Emperor of Austria and King of Hungary, which were considered two independent states, and the crown of both was hereditary in the house of Hapsburg. Legislation was vested in the Austrian and Hungarian diets, but two bodies known as the delegation controlled the ministries, each delegation consisting of sixty members. Twenty of the delegates were elected by the upper house and forty by the lower house, and in alternate years the delegations held sessions in Vienna and Budapest. They represented the parliaments of the two countries and had legislative power relating to the army and navy, finance, foreign relations, diplomatic service, and other affairs of interest to both countries. Each country had an independent local parliament, in which the several provinces were represented according to population.

The divisions that constituted the lands of the Hungarian crown, besides Hungary, were Fiume, Croatia, Slavonia, and Transylvania. The crown lands of Austria, besides Austria proper, included Salzburg, Styria, Carinthia, Carniola, Tyrol, Vorarlberg, Bohemia, Moravia, Silesia, Galicia, Bukowina, Dalmatia, and the coast districts of Görz, Trieste, Istria, and Gradiska. The provinces of Bosnia and Herzegovina constituted imperial territory of the Austro-Hungarian empire. Francis Joseph I. was the reigning sovereign, whose official title was Emperor of Austria and King of Hungary. Financially the country was on a gold basis, though the krone, the standard coin, was not coined in that metal. The monetary system was on a decimal basis or scale of numeration.

The government of Austria, independent of Hungary, was an empire. Legislative power was vested in the *Reichsrat,* which consisted of two branches, the *herrenhaus* and the *abgeordnetenhaus.* The emperor had concurrent legislative power with the *Reichsrat,* and concluded treaties, granted pardons, issued decrees, and could summon or dissolve the *Reichsrat,* but his decrees and acts were countersigned by the prime minister, who was held responsible to parliament. Eight ministers, each presiding over a department, and two ministers at large, discharged the advisory functions of the executive department. The emperor appointed a governor for each province or department, which was divided into *districts* and *communes.* The supreme court of justice and cassation, located at Vienna, had supreme jurisdiction over the system of district, circuit, and inferior courts.

In Hungary the constitution was based on the Golden Bull of 1222 and succeeding statutes and decrees relative to the autonomy of that country. The king did not exercise so great an influence in the government as in that of Austria, and decrees, like in Austria, became valid after being countersigned by a responsible minister. Legislative authority was vested in the Parliament, which was composed of the two houses known as the table of magnates and the house of representatives. In the upper house, or table of magnates, the membership consisted of the nobility, the royalty, and certain dignitaries of the churches, and in the lower house the members were elected by popular male suffrage. A minister president and nine ministers, each ruling a department, exercised executive power and were responsible to the Parliament. Local government was administered by the 63 *counties,* each having a governor, and the counties were divided into districts known as incorporated *towns, communes,* and *presidencies.* The judiciary branch of the government was modeled after that of Austria.

HISTORY. The history of the region then included in Austria-Hungary is more or less associated in its early phases with that of Rome and the empire of the West, and subsequently with the Germanic tribes that passed in successive waves from the regions farther north. Austria as a political power may be said to have taken its rise in 791, when Charlemagne took possession of the region between the Ens and the Raab, driving the Avars from that territory. The Hungarians invaded Germany in 900, when part of the region now included in the country became subject to that people, under whose control it remained fifty-five years, when it was again united with the German Empire under Otho I. From 932 till 1156 it was under control of the counts of Babenberg, became a duchy in the latter year, and received additional territory in 1192, when Vienna became its capital. In 1246 the male line of the house of Babenberg became extinct, and the German emperor, Frederick II., proclaimed the region hereditary property of the German sovereigns. It passed to the house of Hapsburg in 1282, whose original possessions were in Switzerland, and is still the ruling house of the empire. Rudolph of Hapsburg was one of the early sovereigns, was succeeded by his son Albert, who in 1301 obtained the Swabian Margraviate, and at his death in 1308 Austria had an area of 26,000 square miles. Albert V., son-in-law of Emperor Sigismund, is the next monarch of marked influence. He was complicated in the Hussite War, assisting Sigismund in that contest, became Emperor of Germany in 1438, and was succeeded in 1457 by Ladislaus, his posthumous son, and since then the Austrian monarchs are represented in an unbroken German line.

The subsequent history of Austria is more or less closely associated with that of Prussia until in 1866, when the latter country established its preponderance of power at the Battle of Sadowa. Subsequently Italy, which had been more or less under the influence of Austria, became an independent and united state, and Prussia became the head of the German Confederation in the North. Within the period of alliance between Austria and Prussia, the former was involved in many noted conflicts. It bore a prominent part in defending Christianity against the advances of the Turks from Constantinople, was an important battle ground in the Thirty Years' War, exercised a wide influence in the War of the Spanish Succession, and shared in the Napoleonic Wars. Among its most eminent sovereigns are Maximilian II., Maria Theresa, and Emperor Francis Joseph I. Francis II. of Austria was the first sovereign to take the title of Emperor of Austria, which he did as Francis I. in 1804, and it was within the period of his reign that the German provinces became united and sent a powerful army to join the Russian and British allies against Napoleon, thus causing the overthrow of the latter. He was succeeded at his death in 1835 by his son, who ascended the throne as Ferdinand I., and in 1848 succeeded in overthrowing the revolutionary movement led by the Hungarians under Kossuth. Ferdinand abdicated in favor of his nephew, Francis Joseph I., who joined the German states in 1864 in taking territory from Denmark, but two years later Austria and Prussia became permanently separated.

Since the *Ausgleich* of 1867, the government has given marked attention to the internal affairs of the empire, encouraging railroad building, the extension of educational arts, and the furthering of industrial and commercial enterprises. In 1878 the domain of Austria was enlarged by the addition of the provinces of Bosnia and Herzegovina, this resulting in consequence of the war between Russia and Turkey. These provinces were placed under the crown by the Treaty of Berlin for administration and military occupation only, which remained their condition until 1908, when they were annexed as imperial territory by a proclamation of Francis Joseph I. The *Dreibund* (Triple Alliance) was formed in 1882, which pledged friendship among Austria-Hungary, Germany and Italy. Archduke Francis Ferdinand was assassinated in 1914 and the country became involved in the Great European War and was supported by Germany and Turkey, while Italy withdrew from the *Dreibund* and in 1915 joined the Triple Entente. Francis Joseph died in 1916 and was succeeded by Charles I. as emperor. He abdicated in 1918, following the defeat of his armies in Italy, and the country was dismembered by the Paris Peace Congress. The literature of Austria proper belongs almost exclusively to the German, but there is a considerable accumulation of valuable writings in the Polish, Czech, and Bohemian, the latter having its greatest representative in John Huss. See **Hungary.**

AUTOCRAT OF THE BREAKFAST TABLE, the title selected by Oliver Wendell Holmes for one of his most popular books. The author selected after-breakfast periods for talks undoubtedly because he wished to take advantage of the short time of rest and satisfaction many enjoy after eating their morning meals. He himself is the Autocrat and carries on charming conversations, combining humor with witty sayings and philosophical reasoning. The place was at the table of a boarding house in Boston. First published in the *Atlantic Monthly* in 1857 and 1858, the sketches have gone through many editions in book form.

AUTODAFE (a̤'tô-dȧ-fā'), a public ceremony instituted at Seville in 1481, and used in connection with the inquisition in Portugal and Spain. It consisted of a sermon preached to those charged with crime, and at its close the names of those found guilty were announced, while those found not guilty were discharged. The guilty were soon after executed.

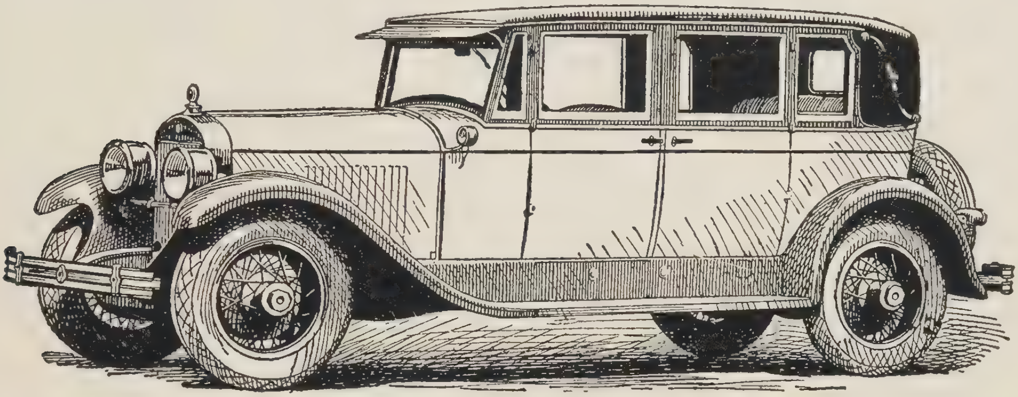
AUTOMATON (a̤-tŏm'ȧ-tŏn), a self-acting machine, such as a clock or watch. The name is likewise applied to a figure made in imitation of an organic being, as a toy turtle with means to propel itself, or a machine performing actions like a human being. The construction of automata dates from a period far remote, before the Christian era, and some of the devices produced became noted. In 1851 a mechanism was exhibited at London which fluttered its wings and imitated the note of the bullfinch. Another product was in the human form and did writing and drawing by clockwork. The famous clock at Strassburg, Germany, is the most noted automaton in existence.

AUTOMOBILE (a̤-tô-mō'bĭl), a vehicle propelled by electric power, gas, steam, or any other force stored or located within the machine. These mechanical structures may be divided into three general classes, including those used on roads for carrying passengers or goods, those designed for vehicles to be employed in place of carriages, and those in the form of bicycles or tricycles to increase the speed and relieve the rider from the exertion accompanying the treading of pedals. The first automobiles were manufactured as early as 1860, but a high state of perfection was not reached until about 1898. While the early vehicles were too clumsy to insure great speed, those of recent manufacture serve a useful purpose by combining speed with utility.

Automobiles are made in a great variety of

AUTOMOBILE. The automobile enters more intimately into every phase of life in Canada and the United States than that of any other countries. One automobile is in use in the United States for every five persons, while in Canada the record is one automobile for every ten persons. These countries use motor vehicles more extensively in business as well as in social and agricultural life than these vehicles are used in Europe and elsewhere. Following is a table showing the number of cars per capita in twenty-four countries in the world, ranging from one car for every five residents in the United States to only one car per 20,000 people in China:

Countries	Population per Motor Vehicle	Countries	Population per Motor Vehicle
United States...	5	Spain	125
Canada	10	Finland	140
Australia	14	Germany	148
United Kingdom	37	Chile	203
France	40	Italy	254
Denmark	41	Mexico	272
Argentina	42	Russia	690
Sweden	55	Irish Free State	810
Switzerland	78	Poland	1,340
Cuba	79	Japan	1,525
Norway	81	Turkey	1,908
The Netherlands.	120	China	20,000



THE POPULAR FAMILY CAR

The automobile now most popular is the six-cylinder, electric-lighted, four-door, five or seven passenger sedan.

World Average. The average for the world as a whole is fifty-nine persons per automobile, about twelve times as many as for the United States. It is apparent that the use of motor vehicles has not reached the point of saturation. On the contrary, the increased use of automobiles is going forward steadily throughout the world. If the automobile were a mere luxury, then we could put the disproportionate use on the basis of wealth alone. There is no doubt that wealth has much to do with it, but the growing influence of the automobile as a necessary part of the economic life of civilized countries places it outside of the category of luxuries and puts it into that of a necessity for social and economic progress. To that extent the growing use of automobile equipment by the world as a whole depends only in part on wealth. To an equally great extent it is an essential factor in such industrial agencies to which every major country of the world is aspiring.

HOW AUTOMOBILES ARE PARKED DURING BUSINESS HOURS AT GRANT PARK, CHICAGO, ILL.

forms and differ vastly in size and capacity. The newer types, first introduced in 1912, have a dynamo to generate power for an electric starter and electric lighting. The electric vehicles, in which the current is supplied from a storage battery, formerly were popular, owing to the movement being attended with less noise and the propelling force supplying power for longer distance than in any other form. However, gasoline vehicles with balloon tires, four-wheel brakes, and electric starters are used most extensively, partly from the fact that electric power cannot be secured in all places and its expense is somewhat greater. Electric batteries of a high class are capable of propelling the machine a distance of 300 miles where reasonable precaution is used.

Much has been done in recent years to make the automobile more popular and extend its use both in pleasure-riding and for the more practical purposes in business. The industry of manufacturing has grown to such proportions that it has been possible to turn out a standard car which is superior in construction and lower in price. At present the most popular vehicle is a six-cylinder car with sedan body, having from forty to sixty horse power, weighing from 2,200 to 2,600 pounds, or a sixty to ninety horsepower, weighing from 2,600 to 3,800 pounds. The wheels are about thirty to thirty-four inches in diameter, with large tires about five inches in diameter. Most cars have a six or eight cylinder motor housed in a bonnet in front, and the power is transmitted by shaft-drive and bevel gears to a live rear axle. Almost perfect lubrication of the engines is obtained by a continuous circulation secured from a mechanical, forced-feed oiler, the oil passing through feed glasses carried in sight at the front of the machine on the dashboard. The cone clutch has given place to a multiple-disk clutch, whose disks run continually in oil, and the clutch takes hold without jar or jerk. By this simple arrangement it is possible to start a car from a standstill to a high speed without danger of breakage.

Automobiles are used extensively in cities for draying and as passenger omnibuses. In many places boulevards and automobile tracks are maintained, and sight-seers prefer to use automobiles rather than any other facilities in pleasure-riding and touring. The speed has been enormously increased until now a rate of fifty to sixty miles an hour is considered fair riding in long-distance tours.

Several manufacturers brought out four-cylinder motor cars with 20 to 30 horse power, the touring car weighing 1,800 pounds. There is a manifest advantage in a four-cylinder motor car, since lighter weight and greater simplicity can be obtained. More recently larger cars with heavier bodies and six or eight cylinders came into use, having the advantage of being less noisy and producing greater uniformity of motion. Probably the five or seven passenger sedan, with six cylinders, water and air cooled, will be the popular structure for the future. However, a large number of cars still use water-cooling without a centrifugal circulating pump, even for the high-powered cars, but the combined air and water cooled type is now the most serviceable. Air-cooled motors of large type are in use to some extent by transportation companies. Several manufacturers of farming implements put out a large number of low-geared tractors for farm use, fitted to move harrows, plows, and other farm implements.

Motor Production. The following figures for 1927 show an increase in motor cars and also an increase of sedan or closed cars:

Motor car production, 1927	3,635,000
Passenger cars	3,066,000
Motor trucks	464,000
Production of closed cars	2,452,000
Per cent closed cars	80
Wholesale value of cars	$2,190,000,000
Wholesale value of trucks	$ 366,750,000
Wholesale value of cars and trucks	$2,556,750,000
Tire production	66,000,000
Wholesale value of tires for replacement	$ 595,000,000

World Record. The world's speed record was won by Maj. H. O. D. Segrave at Daytona Beach, Fla., on Mar. 11, 1929, when he negotiated 231.51 miles an hour. His machine, the *Golden Arrow*, is a British car manufactured in England. It weighs two and one-half tons and is equipped with a 450 horse power engine. The average speed made by Major Segrave in the competitive test was 209.96 miles. This stands in favorable contrast with the record made in 1927 by Major H. O. D. Segrave with his 1,000 horse power *Sunbeam*, which made an average speed of 203.01.

Long trips in motor cars have become popular, and much touring is done by those who otherwise would travel by railway. It is not uncommon for tourists to cross the American continent from the Atlantic to the Pacific, or to drive automobiles long distances for business or pleasure.

The average annual manufacture of passenger cars in the United States, for the five years ending in 1928, was reported at 3,530,000. At the same time the production in Canada was 180,765. It is certain that at some time the demand will be outclassed by the supply, especially in the United States, while the demand in other countries is likely to increase. It must be admitted that the extensive facilities to manufacture motor vehicles in the United States has greatly increased the efficiency and reduced the cost, hence the cars used in Latin America are almost exclusively of American manufacture. This is true largely in Canada, but several American producers of cars are now operating plants in that country and will no doubt be able to supply the home demand more fully than in the past with vehicles produced in the Dominion.

AUTONOMY, (ạ-tŏn′ō-mў), the self-government of a city or state. The term probably originated in ancient Greece, in which country most of the cities were independent for general purposes.

AUTOPLASTY (ạu'tȯ-plăs-tȳ), a surgical operation in which lesions are repaired by using tissues taken from another part of the body to supply deficiencies caused by disease or wounds. Operations of this kind are performed to restore the use of an organ or improve the appearance, and the parts taken may be from the same or some other individual. In many cases the skin is taken from the body of an individual to repair lesions resulting from scalds or burns, or in the case of hairlip. In India autoplasty was practiced in ancient times and it is referred to by Celsus, but in Europe and America the practice is comparatively recent.

AUTUMN (ạu'tŭm), the season of the year which follows summer, and frequently referred to as fall, referring to the fall of the leaves. In the northern hemisphere it extends from about Sept. 22 until Dec. 22, from the autumnal equinox to the winter solstice. In England it embraces the months of August, September, and October, while in America the autumnal months are September, October and November.

AUVERGNE (ō-vârn'ȳ), formerly a province in Central France, now merged into Cantal, part of Haute-Loire and Puy-de-Dôme. The region is traversed by the Auvergne Mountains, a branch of the Cevennes Mountains, and their peaks are the highest of Central France. Among the most lofty summits are Puy-de-Dôme, 4,806 feet; Cantal, 6,095 feet; and Dore, 6,188 feet. Owing to peculiar volcanic and geologic formations, the region is one of scientific interest, and has been much studied by students. There are deposits of coal, copper, iron, and lead, and numerous mineral and thermal springs. The mountain slopes are covered with a fine growth of grass, while the valleys abound in fruits, cereals, and live stock.

AVA (ä'vȧ), the former capital of Burma, on the Irawadi River, opposite Mandalay, the present capital. It is surrounded by walls and has several Buddhist temples. Formerly it was a large city and commercial center, but it was destroyed by an earthquake in 1839. Population, 1921, 38,500.

AVALANCHE (ăv'ȧ-lănch), the name applied to masses of ice or snow that slide down the sides of mountains to lower levels. These masses differ somewhat in the nature of the falling material, this depending upon climatic conditions and the season of the year. Drift avalanches consist of dry or loose snow set in motion by the wind, and in falling or sliding accumulate larger masses in the descent, finally reaching the valley in clouds of dust-like snow. This class occurs in the cold seasons, and is attended by danger on account of a liability to destroy animals and buildings. Avalanches of a somewhat different character occur in the spring and at the seasons of melting snows. These cause the sod to be detached and carried with the snow down the mountain side, and in falling frequently create a draught of wind sufficiently strong to destroy buildings and even forest trees. Ice avalanches consist of ice masses that detach from glaciers in upper regions and slide with great force down the mountain-sides. The latter class are most common in the Alps of Europe, where much property and many lives have been lost on account of their damaging effects. A class of avalanches called snowslides occur in the Rocky Mountains, where they frequently form an obstruction to railroad trains. The term is also applied to landslides, which arise from quantities of earth becoming loosened near the upper part of an eminence and sliding to a lower elevation.

AVE MARIA (ä'vȧ mȧ-rē'ȧ), meaning hail Mary, a form of address used among Roman Catholics in addressing the Virgin Mary, as an expression of honor and when requesting her intercession. It is usually coupled with the recitation of the Lord's Prayer and is repeated three times each morning, noon, and evening at the ringing of the bells known as the Ave Maria or *Angelus Domini.* The term came into use from the salutation of Mary by the Archangel Gabriel, Luke i., 28, and the form of address was sanctioned by a papal edict in 1326. Pope Pius V. ordered the daily use of the whole prayer in 1658, consisting of the three parts: 1, "Hail Mary, full of grace, the Lord is with thee;" 2, "Blessed art thou, among women, and blessed is the fruit of thy womb;" 3, "Holy Mary, mother of God, pray for us sinners now and in the hour of our death."

AVERAGE (ăv'ẽr-ȧj), the mean proportion between two certain given quantities. To obtain the average the given number of quantities are added, and the sum is then divided by the number of quantities given. For instance, to find the average number of days in the months, add the days of the months, which, in a year not a leap-year, equal 365, then divide by twelve; the quotient is the average. In a similar way the averages of different quantities may be ascertained.

AVERNUS (ä-vẽr'nŭs), a small lake in Italy, about eight miles west of Naples, and now called Lago d'Averno. It occupies the crater of an extinct volcano, is a mile and a half in circumference, and about 190 feet deep. There is no natural outlet, but Agrippa made an artificial passage for its overflow into the Gulf of Baiae. Since then the passage has been closed up by volcanic action, and there is now no visible outlet. The scenery around the lake is wild and grand, and at various times sulphurous vapors arise, circumstances by which the people in ancient times were led to believe that Lake Avernus is the entrance to the infernal regions. It was dedicated to Proserpine, and, according to legend, Ulysses frequently visited there the ghosts of the dead. On the south side of the lake is a formation mentioned as the grotto of the sibyl, and near it are ruins of a temple dedicated to Apollo.

AVESTA (ȧ-vĕst′ȧ), or **Zend-Avesta,** the sacred scriptures of the religion of Zoroaster, and in use by the Parsees as their Bible. The French scientist, Anquetil Duperron, translated it in 1771. This work in size is about one-tenth of our Bible, and at least portions of it date from remote antiquity. The Avesta represents the oldest faith of Iran and was the law of ancient Media and Persia. See **Parsees.**

AVIARY (ā′vĭ-ȧ-rȳ), an inclosure for breeding, rearing, and keeping birds. The first mention of aviaries is in connection with the ancient Persians, but later like structures were built in Greece and Rome, and in the 16th century similar inclosures were constructed in Western Europe. Excellent aviaries are now maintained in many of the zoölogical gardens of America and Europe, and in them may be seen beautiful birds of song and plumage from many climes.

AVIATION. See **Balloon; Flying Machine.**

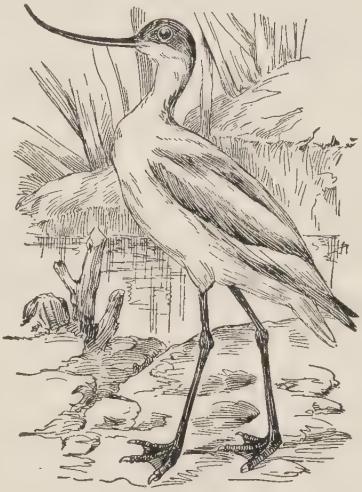
AVICENNA (a-ve-chen′na), or **Ibn-Sina,** physician and philosopher, born at Efsene, near Bokhara, about 980; died in June, 1037. He was a student of philosophy and mathematics, and took up the practice of medicine at Hamedan. His "System of Medicine" is the most important of his numerous works, and was a standard of authority in the schools of Europe for five centuries. He studied Aristotle and tried to reconcile religion with the sciences.

AVIGNON (ä-vēn-yôn′), a city of southeastern France, on the Rhone River, capital of the department of Vaucluse. The city has extensive railroad facilities, is improved by gas and electric lights, pavements, and several fine parks, and is the seat of a number of schools. It has many fine churches, on account of which it is familiarly mentioned as the "City of Bells." These include the Notre Dame, a fine cathedral, which served as the residence of Pope Clement V. and six of his successors. The city was also the residence of Petrarch, and it was here that he formed the acquaintance of Laura, the lady whom he mentioned in several sonnets. In the 14th century the city had a population of fully 100,000, but it lost its importance through the fortunes of war. It has been a part of France since 1791. At present it has a considerable trade in silk, fruit, and manufactured articles. Population, 1922, 48,312.

AVOIRDUPOIS (ăv-ẽr-dů-poiz′), a standard of weights used for all articles of merchandise, except gems, medicines, and precious metals. The grain is the foundation of both the troy and avoirdupois systems. In avoirdupois weight the pound is divided into 16 ounces, the ounce into 16 drams, and the dram into 27 11-32 grains.

AVON (ā′vŭn), the name of several rivers in Europe, including one in France and several in the British Isles. The most important is the Avon River in England, which rises in Leicestershire, flows past Stratford, the birthplace of Shakespeare, and enters the Severn at Tewkesbury. It has a length of 100 miles, and its valley is noted for fertility.

AVOSET (ăv′ō-sĕt), or **Avocet,** the name of a bird belonging to the order of the *grallatores,* and represented by one species in America and one in Europe. The structure is quite similar to that of the snipe. The bill is long and feeble, the legs are long, the feet are webbed, and the plumage is variegated with black and white. These birds frequent low and marshy places, where they feed on worms, insects, mollusks, and aquatic animals. The avoset is a common bird in many parts of the United States and Canada, but is met with most extensively in the regions of large marshes. The flesh is highly prized as food.



AVOSET.

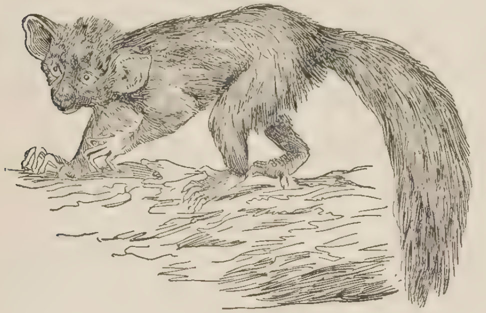
AX (ăks), an instrument for cutting or chopping wood or timber, usually made with an iron head and a handle of wood. One edge is sharp for cutting. The ax is used with both hands, but a smaller instrument called a *hatchet* is intended for one hand. It has been in use from remote times, forming a useful implement for savage and civilized people. The first axes were made of flint rock, later of bronze, and finally of iron. In modern times axes came to be made of wrought iron with a cutting edge of steel, while some kinds have two cutting edges. The American Indians made hammers and hatchets of stone, the latter being popularly known as *tomahawks.* The *adz,* a tool used by carpenters for smoothing timber, has a chisel-shaped edge from four to five inches long.

AXIOM (ăks′i-um), a general statement which admits of no demonstration, and is taken for granted as a self-evident truth. Fundamental propositions and established principles underlie every science, and are to be taken by the student without proof as a basis for further argument. That he who admits a principle admits its consequences is an axiom in logic. Again, that the whole is greater than its parts is an axiom in geometry.

AXIS (ăks'ĭs), a straight line, either real or imaginary, drawn through a body, around which that body may revolve. The term is applied in geometry to a line imagined drawn through a plane figure, about which the parts of the figure or body are symmetrically arranged. In botany the term is applied to the central portion of the higher plant, on which are borne the appendages or lateral members. The root is termed the *descending axis,* and the stem the *ascending axis.*

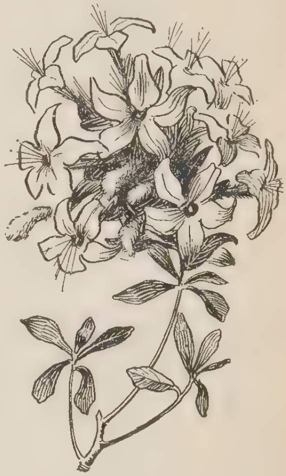
AYACUCHO (ī-ȧ-kōō'chō), a city of Peru, capital of a department of the same name, 240 miles southeast of Lima. It is located on a tributary of the Mantaro River, about 7,500 feet above the sea, and the surrounding country is agricultural. A fine church building, a university, and the government house are the chief public improvements. In 1824 it was the scene of a battle between the allied forces of Peru and Colombia and the Spaniards, in which the latter were defeated. Population, 1900, 22,000; in 1922, 23,875.

AYE-AYE (ăĭ'ăĭ), a small quadruped native to Madagascar, so named from its peculiar cry. It belongs to the lemur family, is about the size of a hare, and has a long bushy tail. The fingers are long, which it uses to secure the grub of wood borers, upon which it feeds, but it also eats fruits and the tender part of plants. During the daytime it sleeps and at night it goes out in search of food.


AYE-AYE.

AYR (âr), a seaport of Scotland, in Ayrshire, at the mouth of the Ayr River. It is located about 35 miles west of Glasgow, with which it has connection by railway. The buildings includes an academy, a public library, and several churches. The manufactures include carpets, boots and shoes, textiles, and earthenware. Having a good harbor on the Firth of Clyde, it exports coal and imports grain and iron ore. The cottage in which Robert Burns was born is about two miles south of Ayr, and near it are the Alloway Church and the Doon of Tam o'Shanter. Population, 1911, 32,985.

AZALEA (ȧ-zā'lē-ȧ), a genus of plants of the heath family, many species of which are cultivated in greenhouses and flower gardens for their beautiful and fragrant flowers. Fully 100 species have been described, though only a small proportion has been developed into cultivated plants. The flowers form in profuse umbelled clusters and in color are either purple, orange, white, or variegated. They thrive best in a sandy soil of peat or loam, and are well adapted to cultivation in shaded places. The azaleas are native to America and Eurasia; all the American species are deciduous.


AZALEA.

AZARIAH (ăz-ạ-rī'ah), a name in common use among the Jews, and applied in history to a number of Hebrew rulers. The most important personage bearing this name was Uzziah, the tenth King of Judah, who reigned about 809 B. C. In Scripture the name is also applied to a Chaldean friend of Daniel, to a high priest who aided Hezekiah in the temple worship, and to a prophet who met Asa after the latter won a victory over the King of Ethiopia.

AZOIC. See **Archaean.**

AZORES (ȧ-zōrz'), an island group in the Atlantic Ocean, situated west of Portugal, and forming a part of that kingdom. The islands nearest Portugal are about 800 miles west from the coast, but the entire group is considered as belonging to Europe. These islands are of volcanic origin and are subject to earthquakes. Pico Alto, the highest volcanic summit, has a height of 7,540 feet. Pico, São Miguel, Santa Maria, and Terceira are the most important islands, and the entire group embraces an area of 1,005 square miles. The chief productions are tropical fruits, cereals, vegetables, and live stock. Vegetation partakes of luxuriant forms, the soil possesses fertility, and the climate is favorable to Europeans. The larger part of the inhabitants are Portuguese and Spaniards, most of whom are quite poor. The government has promoted the building of several railroad lines, and it has a number of canal and harbor improvements. Cabral discovered the Azores about 1431, claiming them in the name of Portugal. At that time they were entirely uninhabited by man, but plants, birds, and small quadrupeds were abundant. A species of hawks, called *açores* by the Portuguese, gave the name to the islands. Ponta Delgada is the capital and chief town, but Angra is the usual residence of the governor. Population, 268,590.

AZOV (ä-zŏv′), or **Azof,** an inland sea of Southern Russia, forming a branch of the Black Sea, with which it is united by the Strait of Kertch. Though the sea is comparatively shallow, it is valuable for navigation by vessels of small draught, and yields an abundance of fish. Its greatest length is about 230 miles; breadth, 112 miles; and area, 14,000 square miles. The water is nearly fresh, owing to the large inflow from the Don River and several minor streams. In the Crimean War, in 1855, the Sea of Azov was the seat of great naval activity, which was directed with the view of cutting off the food supply and otherwise affecting Sebastopol.

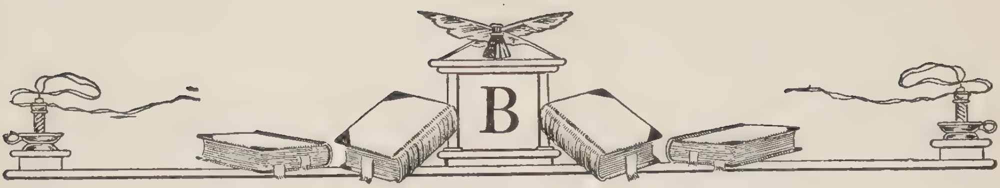
AZTECS (ăz′tĕks), the name of the inhabitants of Mexico at the time of the Spanish invasion in 1513. Though the name is frequently applied to all the native inhabitants of Mexico at that period, it strictly belongs to only one of a number of tribes. According to tradition, the Aztecs came from a country which they named *Aztlan,* a region reputed to be situated northwest of Mexico, though its exact location has never been ascertained. The date of the exodus from Aztlan is fixed at 1164 A. D., and their arrival in the valley of Mexico is placed at 1216, when they succeeded the Toltecs, a superior race. In 1325 they founded the City of Mexico, naming it the City of Tenochtitlan from their chief Tenoch.

At the time of the Spanish invasion the City of Mexico offered considerable resistance to the Spaniards, owing largely to strong natural and artificial fortifications, and partly to the overwhelming numbers of the Aztecs. After successive assaults the city was occupied by the invading army under Cortez. At that time the people were given to war and idolatry, but they had obtained marked advancement in astrology and astronomy, taught the arts of reading and writing, and possessed considerable knowledge of architecture. They maintained many temples, which were built on substantial terraced pyramidal bases, numerous ruins of which still remain. The horse, ox, and other domestic animals were unknown to them, but, notwithstanding this disadvantage, they evidenced material advancement in agriculture, and cultivated large tracts of land in maize and agave. They possessed material skill in weaving, feather work, pottery, and metal work.

Much of the history of the Aztecs was recorded in hieroglyphics on the walls of temples and pyramids, and they not only prepared lunar calendars, but devised astronomical apparatus and designs of considerable value. However, they were given to superstition, and sacrificed human beings to their gods. Their legendary was quite extensive, containing numerous interesting details and accounts of heroes, teachers, and priests. The education of the young devolved on a priesthood, which they supported by tithes. Their last ruler, Montezuma, was reigning when the Spanish made their invasion under Cortez. He was imprisoned and afterward killed by the Aztecs in their revolt against Spanish dominion. These people are of great interest to the student of history, since their civilization and government, though springing up mysteriously, resembled in many respects the archaic oriental institutions. Bancroft's "Native Races of the Pacific States" and Mara L. Pratt's "Cortez and Montezuma" contain interesting accounts of the earlier inhabitants of Mexico.

AZURITE (ăzh′ů-rīt), a carbonate of copper, found as an ore of copper and as an ornamental stone. It is crystalline, deep blue in color, and not hard enough for jewelry. Deposits of it occur in Arizona, where it is found in limestone and is accompanied by other ores of copper, such as limonite and malachite. It occurs in small quantities near Lyons, France, and in Siberia. The Siberian azurite is cut in slabs and used for table tops. Some grades are useful as a pigment and others are quite hard and suitable for settings in jewelry.

AZYMITES (ăz′ĭ-mītes), the name used by the Greek Church to designate the Roman Catholic Church, because the latter had decided that unleavened bread should be used in the sacrament. The controversy as to whether leavened or unleavened bread should be used began about 1045, when Michael Caerulairus, patriarch of Constantinople, designated the use of unleavened bread as a remnant of Judaism. To this the Latin Church retorted by calling the adherents of the Greek Church Pro-zymites and Fermentarians. The unleavened bread or wafer is still used by the Roman Catholic Church, while many of the Protestant churches use the leavened bread.



B, the second letter and the first consonant in the English alphabet, and in that of most Indo-European languages. It is a sonant element of speech of the class known as labial mutes. In some languages it is interchangeable with p, especially when it occupies a terminal position in a word or syllable. It is produced mostly by the lips, and combines the utterance of voice and breath. In music B is the seventh note of the diatonic scale of C, in which connection it is termed the *leading note,* calling for the octave C to follow it.

BAADER (bä'dẽr), **Franz Xaver von,** eminent philosopher and theologian, born in Munich, Germany, March 27, 1765; died May 23, 1841. He was the discoverer of a new method of employing salts instead of potash in making glass, and received a prize of 12,000 gulden, about $5,000, as a reward. He published a number of works on religion, and attained much celebrity by lecturing against church interference in civil matters. Baader ranks as the greatest speculative theologian of modern Catholicism. His best known work is "Speculative Dogmatism."

BAAL (bā'al), or **Bel,** a Hebrew and general Semitic term which implies lord, and used to designate different divinities. It was the name of the principal god worshiped in the nations of Canaan and Phoenicia, with whom Ashtoreth ranked as the principal goddess. These people regarded Baal the god of the sun, ruler and life-giver to the universe, and opposed to Moloch, who ranked as the god of destruction. Worship was at first conducted on the mountain tops among the Midianites, Moabites, and other peoples of Western Asia. In Greece the practice of mountain worship was attached to Hercules. Baal was an important divinity among most Semitic peoples, even among the children of Israel, from whose midst his worship was ultimately banished under severe punishment. From the word *Baal* other words commonly used have originated, among them Baalgad, Jezebel, Hannibal, Asdrubel, and Belshazzar.

BAALBEK (bäl-bĕk'), an ancient city in Syria, forty miles northwest of Damascus, famous for its ruins of magnificent structures of antiquity. One of the chief temples was dedicated to the sun. In its construction blocks of stone twelve feet thick and sixty feet long were used, as is evident from some of the columns and walls that are still standing. In the time of Julius Caesar the city formed a Roman possession. It was sacked by the Arabs in 748, pillaged by Timur in 1400, and completely destroyed by an earthquake in 1759. Some of the ruins are the most massive as well as extensive in the world, among them those of the temple of Jupiter, which is still larger than the Parthenon at Athens.

BABBITT METAL (băb'bĭt mĕt'al), a soft alloy made by melting together two parts of copper, six parts of tin, and four parts of antimony, and then adding six parts more of tin. A little powdered charcoal is used to prevent the metal from oxidizing. Babbitt metal was first made by Isaac Babbitt, a goldsmith in Boston, and is used to reduce friction, abrasion, and heat in the bearings of axles and journals.

BABEL (bā'bĕl), **Tower of,** a great tower mentioned in Genesis xi. It was situated in the land of Shinar, Mesopotamia, and was built by the descendants of Noah. The tower was to reach unto heaven, but the language of the builders was confused by God, so they could not understand each other, and the work was abandoned. The Babylonians and Greeks had a similar account of a great tower. It is said that when the giants sought to scale the heavens they were overthrown by Zeus. Several ancient writings make it probable that the Tower of Babel was located at Babylon, and that it was completed by Nebuchadnezzar, the great king. Tourists are referred to several ruins on the site of the ancient city; those most probably authentic are at a place called Amram, and form a mound 150 feet high, with a base over 3,000 feet long and 2,500 wide.

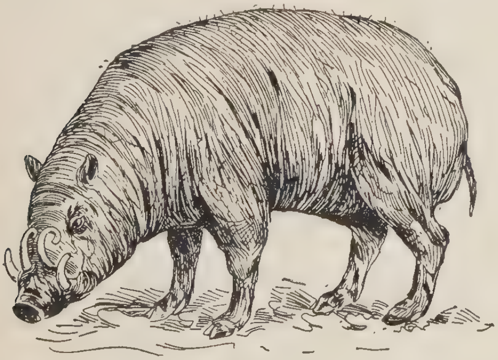
BAB-EL-MANDEB (băb-ĕl-män'dĕb), meaning *Gate of Tears,* a cape and strait in the southern extremity of Arabia. The strait is fifteen miles wide, and connects the Red Sea with the Arabian Sea and the Indian Ocean through the Gulf of Aden. The island of Perim divides the strait into two channels, the western of which is twelve and the eastern two miles wide.

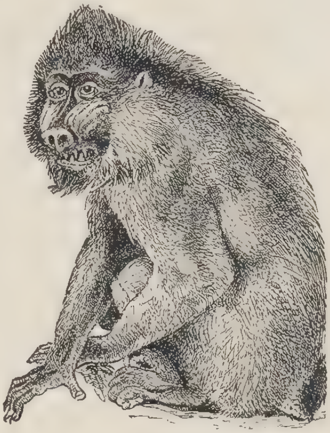
BABINGTON (băb-ĭng-tŭn), **Anthony,** public man, born at Dethik, England, in 1561; executed Sept. 20, 1586. He became a page to Mary Queen of Scots, at the time of her confinement at Sheffield, and entered a conspiracy to release Mary and murder Queen Elizabeth. The plot was discovered and Babington and several others implicated were executed about four months before the execution of Mary. It is thought that the latter was implicated and approved of the conspiracy, but this she denied.

BABIRUSSA (băb-ĭ-rōōs'sȧ), or **Babyrussa,** a wild hog native to the islands of Buru and Celebes. It has slender legs, is almost without hair or bristles, and feeds upon fruits and plants instead of rooting in the ground. In the male the canine teeth grow upward and form tusks, sometimes from eight to ten inches in length, and curve backward like horns. The flesh is eaten by the natives.

BABISTS (băb'ĭsts), the name of a sect of Mohammedans founded in 1843 by Ali Mohammed ibn Redha. Babism teaches that Christ, Moses, and Mohammed were prophets and forerunners of the Bab, who is considered the greatest of the prophets. It recognizes the equality of the sexes in social matters, opposes polygamy, and permits the remarriage of the divorced women, though in spirit it opposes the granting of divorces. A civil war resulted from the agitation of the Babists, who secured many adherents, and the Bab was captured and shot at Tabriz in 1850. The total number of Babists is estimated at several million.

BABOON (băb-ōōn'), the name applied to a division of apes and monkeys found in Asia and Africa. They are among the largest of this class of animals and possess great strength. Most species have long, abrupt muzzles, like a dog, short tails, deep eyes, large eyebrows, and strong teeth. They belong to the quadrupeds, run swiftly on all fours, and cannot maintain themselves with ease in an upright posture. They are fierce, ugly, cunning, and dangerous when attacked. Their size is that of a large dog, but the *mandrill,* a species of baboon, is about the size of a man when standing erect. These animals live in colonies or herds, have recognized leaders, and carry on warfare against kindred herds and against other wild animals. Their food consists of twigs, roots, fruits, and grasses, but they sometimes eat lizards, birds, and similar small animals. The *common baboon* is found in large parts of Northern Africa, the *gelada* in Abyssinia, the *chacma* in Southern Africa, and the *black baboon* in Celebes. In many localities incessant war is waged against them on account of their ravages in the gardens, cultivated fields, and meadows.


BABIRUSSA.


BABOON.

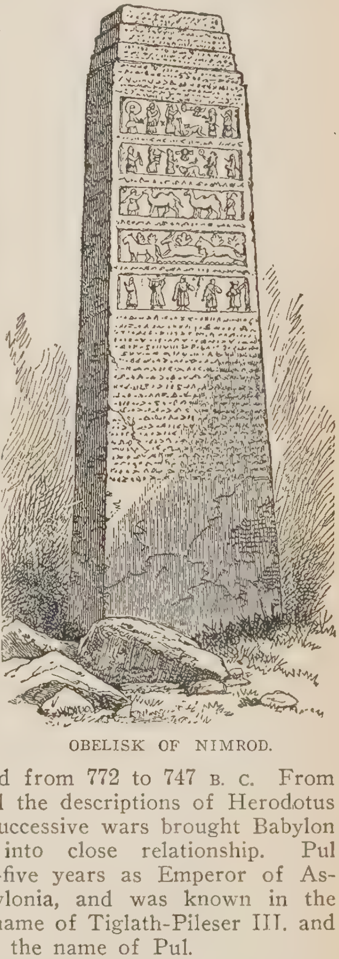
BABYLON (băb'ĭ-lọn), the capital of the Babylonian Empire, on the Euphrates River, anciently one of the largest and most beautiful cities of the world. It was founded by Queen Semiramis, who spent many years and employed thousands of workmen in its improvement. Mention is made of it as a great city as early as 1500 B. C., but its importance dates from about 680 B. C., when it was reconquered by Sennacherib, and made one of the two capitals of Assyria. After the fall of Nineveh, in the time of Nebuchadnezzar, it was improved in magnificent style, and at that time attained its greatest glory. The city was built in the form of a square, each side of which was fifteen miles long. High and massive walls fortified it against its enemies, while in it were the most beautiful edifices, terraced structures, pleasure gardens, verdant parks, and the *hanging gardens,* one of the seven wonders of the ancient world. The celebrated Tower of Babel, or Temple of Belus, a remarkable structure of brick and stone, stood within the city, and was 625 feet high. The surrounding country was beautified by gardens, orchards, canals, and commercial highways. Both sacred and profane history make mention of this city as the most beautiful and one of the greatest of remote antiquity.

Babylon was conquered by Cyrus, King of Persia, in 538 B. C., who entered it by the river channel, having previously turned the water from its course by a great canal. It then became a part of the Persian dominion, and with this conquest began a rapid decline. When Alexander the Great led his expedition into Asia, he found the city greatly damaged, but still beautiful. He undertook to rebuild it with 10,000 men, but after two months' labor gave up the enterprise. Subsequently, the city declined rapidly, crumbling away on account of successive wars. In its ruins were found many curious and valuable relics, among them divers cuneiform inscriptions and casts, some of them throwing much light upon ancient history. Most of the material, such as brick and stone, was used in building up the new City of Seleucia, which was founded by Seleucus, the successor of Alexander the Great.

BABYLONIA (băb-ĭ-lō′nĭ-ạ), the name of an ancient country on the Lower Euphrates; the region occupied by it is now called Irak-Arabi. Ancient writings indicate that the empire was located south of Mesopotamia, west of Assyria, north of the Gulf of Persia, and east of the Desert of Arabia, but during its greatest prosperity it included Assyria, Mesopotamia, and practically all of Western Asia. In sacred history it is referred to as the land of the Chaldees, and also mentioned as Babel and Shinar. The region has ranked for ages as one of the most fertile districts in Southwestern Asia. Anciently its fertility depended, not alone upon nature, but a large number of irrigating canals and aqueducts were maintained to supply the soil in arid districts with moisture sufficient to insure production. From the Grecian historian, Herodotus, who made several visits to the site of this once great empire, we learn that it supplied its own people and one-third of the population of Persia with corn and other cereals. Its civilization is as ancient as the civilization of Egypt, perhaps, beginning with the year 4000 B. C., but historic records reveal nothing back of the year 2400 B. C.

People. The inhabitants of Chaldea consisted of a mixture of Hamites, Semites, and other classes. Their languages and races were mixed at all times. One of their earliest leaders was a noted hunter named Nimrod, who organized separate tribes under a single government. Later Abraham, the first of the Israelite fathers, ascended the Euphrates and subsequently the Assyrians built great cities on the Middle Tigris. Some writers regard the Babylonians as a branch of the Semitic stock and class the non-Semitic elements as primitive Aryan tribes. They assert that the inscriptions found on monuments prove beyond a doubt that the cuneiform writing was first used for a non-Semitic language. This language they term Sumerian and trace it to the Aryans, whom they regard the real fathers of Babylonian culture. Babylon, known to the Hebrews as Shinar, was the capital and largest city of Babylonia. It was the center of Babylonian culture and influence. Besides Babylon, the principal cities were Eurech, Ur, Calneh, Nippur, and Sippara.

History. Little is known of the early history of the Babylonians, though they possessed many works in geography, history, astronomy, and poetry, and accumulated extensive libraries. The earliest writer of whom we have any information is Berosus, a priest, who lived in the time of Alexander the Great, and wrote a history of his country largely from the records of the Temple of Belus. While this work is lost, portions were quoted in other books, and from them we have secured considerable information of the early history and customs. According to this source of information, the Chaldean dynasty reigned from 2001 to 1543 B. C., the Arabian dynasty from 1543 to 1298, and the dynasty of forty-five Assyrian kings from 1298 to 772, and that the reign of Pul extended from 772 to 747 B. C. From this history and the descriptions of Herodotus we learn that successive wars brought Babylon and Nineveh into close relationship. Pul reigned twenty-five years as Emperor of Assyria and Babylonia, and was known in the former by the name of Tiglath-Pileser III. and in the latter by the name of Pul.


OBELISK OF NIMROD.

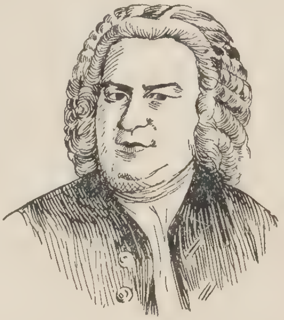
In 722 Assyrian sovereignty was thrown off under the leadership of Baladan II., but twelve years later Babylonia was again conquered. When the northern neighbor declined, Babylonia regained his power and rose to a height never before attained. Nebuchadnezzar was its greatest king. He reigned from 604 to 561 B. C., reconquered lost provinces, rebuilt canals, erected palaces and temples, constructed great aqueducts and lighthouses, and made Babylon, the capital, once more the greatest city of the nations. He conquered Jerusalem, carried the king and a large portion of his subjects into captivity, and later destroyed the Jewish capital. To gratify his Median wife and remind her of her mountain home, he built great towers, the hanging gardens, and beautiful parks, and ornamented them with rare trees, grasses, foliage, and flowers. After the death of this mighty king, the empire survived but twenty-four years, when Nabonidus and Belshazzar were conquered by Cyrus the Great, King of Persia, in 538. About two centuries later, in 328, it was made a part of the dominion of Alexander the Great, who undertook to rebuild the capital city, and subsequently was conquered by rulers of Syria, Parthia, Rome, and the caliphs of Bagdad. Later it fell under the dominion of the Turks and Tartars. The only remains that mark the once powerful empire are scattered tribes who descended from the ancient Babylonians and the ruins of its great cities.

BABYLONISH CAPTIVITY (băb-ĭ-lō′-nĭsh căp-tĭv′ĭ-tȳ), the deportation of a large portion of the leading inhabitants of Judah, under Nebuchadnezzar, in 588 B. C., after the fall of Jerusalem. The term is likewise applied to a prior captivity, in 597, when many Israelites were deported to Babylonia. While the principal part of the Jews were in captivity, Zedekiah became king over the remainder, but he was vanquished and the kingdom of Judah was brought to an end by the powerful Chaldeans. While in captivity, they were allowed religious freedom. At this time Ezekial, one of the great prophets, gave spiritual inspiration to the despondent people, and they were finally liberated when Cyrus overthrew the Babylonian Empire in 538 B. C.

BACCALAUREATE (băk-kȧ-la̤′rē̇-ȧt), the degree of bachelor of arts, which is the lowest of the academical degrees conferred by the institutions of higher learning. A baccalaureate sermon is a farewell discourse to a class of graduates, usually delivered the last Sunday before graduation.

BACCHUS (băk′kŭs), also called Dionysus, in Greek mythology, the son of Zeus and Semele. He was the god of wine and personification of the blessings of vegetation generally. He was snatched by Zeus from the devouring flame in which his mother perished, when she beheld that deity in all his divine glory. The motherless child was intrusted to Hermes and later taken in charge by Silenus, the son of Pan, and brought up by the nymphs. He led great armies and conquered Damascus and the Amazons. It is related that he taught the culture of the vine and the art of making wine, which soon became a favorite beverage. He was worshiped by many ancients, including Midas, the wealthy king of Phrygia. Being the god of wine, he was calculated to promote sociability, and is represented in statuary in company with Bacchantes, satyrs, and mountain nymphs. The Romans had a divinity called Liber who presided over vegetation. He was identified with the Greek Bacchus and was celebrated at festivals called Liber, on the 17th of March.

BACH (bäk), **Johann Sebastian,** eminent musician, born in Eisenach, Germany, March 21, 1685; died July 30, 1750. He was the son of a musician, Johann Ambrosius, who instructed him in that art at an early age, and later he studied at Luneburg and Hamburg. He was engaged as a player at Weimar in 1703, and the next year became an organist at Arnstadt. While here he came into prominence by the composition of numerous cantatas. Subsequently he was organist at the court of Weimar for nine years, where he studied Italian music during his leisure hours, and composed many musical productions still popular. Later he secured an appointment at Leipsic, where he wrote many choruses and composed extensively. By special invitation of Frederick the Great he paid a visit to Potsdam, where he was received with royal favor and accorded marked honors. Among his most famous productions are "Musical Offering" and "The Art of Fugue," His compositions are largely devoted to religious subjects, and include both vocal and instrument pieces on the piano, organ, and stringed instruments. They aggregate a large collection of cantatas, oratorios, and passion music. To him is due the method of piano tuning, by which musicians can play all the keys and make use of all the fingers. More than fifty noted musicians have come from his family, which consisted of twenty-one children. Among his chief compositions are "The Contest of Phoebus and Pan," "Herewith I Come Before Thy Throne," and "The Well-tempered Clavichord."



JOHANN SEBASTIAN BACH.

BACHE (bāch), **Alexander Dallas,** physicist, born in Philadelphia, Penn., July 19, 1806; died in Newport, R. I., Feb. 17, 1867. He was a grandson of Sarah, the only daughter of Benjamin Franklin, who had married Richard Bache in 1767. In 1825 he graduated with the highest honors at West Point, where he became an instructor, and at the same time held a commission as lieutenant of engineers. From 1827 to 1836 he held the professorship of mathematics, and was then made president of Girard College. In 1843 he became superintendent of the United States Coast Survey. His contributions to scientific journals were numerous, and he labored earnestly to elevate the position of physical science in America. He was connected with many scientific societies of America and Europe, whose work he promulgated with considerable vigor, and bequeathed large sums of money for educational purposes.

BACHELLER (băch'ĕl-lẽr), **Irving,** author, born at Pierrepont, N. Y., Sept. 26, 1859. After attending the public schools of his native town, he took a course at Saint Lawrence University, where he graduated in 1882, and engaged for some time as a newspaper writer. He was editor of *The Pocket Magazine* and served on the staff of the New York *World.* Besides contributing many thoughtful articles to newspapers and magazines, he published "Eben Holden," "The Master of Science," "The Still House of O'Darrow," and "Darrel of the Blessed Isles."

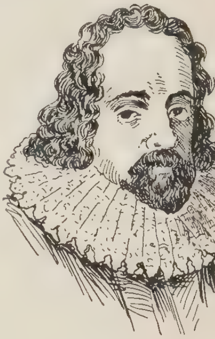
BACHELOR (băch'ẻ-lẽr), a male of marriageable age, but who is unmarried. When he passes the age at which most men are married, thirty years, he is called an old bachelor. In many countries a special tax is imposed upon male celibates, on the ground that every citizen should bring up legitimate children as a support of the State. In Greece and Rome bachelors were denied many of the privileges accorded citizens.—Bachelor of Science (B. S.), Bachelor of Arts (B. A.), and other similar terms are used to designate the completion of certain college or university courses of study.

BACKGAMMON (băk'găm-ŭn), a game played with dice upon a board or table made for the purpose. The table has two compartments, each with twelve points, six points on each side, or twenty-four in all, and the points are colored alternately red and black. Two persons play the game, each of whom has a dice, which is thrown with the view of moving the "men" or checkers, of which there are fifteen for each player, onward or in such a manner as to bring his own men into his own inner table and to prevent his adversary from doing the same. The game requires skill and has long been a favorite pastime in England, where it is said to have originated.

BACON (bā'k'n), the name of a kind of cured pork, taken from the sides and back of the hog. It is cut in large pieces and salted in a dry condition, after which it is smoked. The best grade is derived from the part of the hog in which the fat is mixed with lean meat. Large quantities of bacon are prepared in packing houses and sold in markets or exported, and considerable is packed in sealed tin cans ready for domestic consumption. Bacon is either boiled or fried before being served. It is a favorite article of food, especially when fried with eggs.

BACON, Augustus Octavius, public man, born in Bryan County, Ga., Oct. 20, 1839. He graduated at the University of Georgia in 1859, was admitted to the bar, and served in the Confederate army during the Civil War. Subsequently he had an extensive law practice at Macon, and in 1870-93 was a member of the State Legislature. He was elected United States Senator in 1895 and was reëlected in 1901, 1907 and 1913. He died Feb. 14, 1914.

BACON, Francis, scholar and statesman, born in London, England, Jan. 22, 1561; died April 9, 1626. He was the youngest son of Sir Nicholas Bacon, a lawyer and statesman, and was endowed with much natural talent. At the age of twelve years he began the study of philosophy and languages at the University of Cambridge, and wrote a number of papers against the theories of Aristotle four years later. He soon became prosperous as a lawyer, but proceeded to Paris, where he was occupied with diplomacy and scientific investigations until 1579, when he returned to England on account of the death of his father. In 1603 he was knighted and appointed counsel to the crown, and in 1613 became attorney general, in which position he appeared in an unfavorable light on account of allowing Peacham, a clergyman, to be tortured by the rack. In 1617 he became keeper of the great seal; in 1619, lord chancellor, with the title of Lord Verulam; and the next year was made Viscount Saint Albans. Bacon abused his high position by increasing his personal income, and became involved in a great scandal. Parliament authorized an inquiry in 1621 on an accusation of bribery. He confessed to twenty-three acts of corruption, was fined $200,000, imprisoned in the Tower during the pleasure of the king, and banished from court for life, and from official employment. His fine was remitted after an imprisonment of two days. Later he was put on a pension of $6,000 a year. This enabled him to devote himself to science and literature. At the time of his death his debts amounted to $110,000.


FRANCIS BACON.

While the life of Lord Bacon in public office is clouded with dishonor and meanness, his scientific and literary work is illuminated with his intellect, which towered far above that of other men of his time. His most popular works are "Essays," "History of the Reign of Henry VII," "Advancement of Learning," "Wisdom of the Ancients," and "Sermones Fideles." His works relate to all subjects from jurisprudence to morality and medicine. The only science with which he was unacquainted is mathematics. His writings teem with the most profound thought, gifted language, and energetic style. Determined in his researches, he spared neither exertion nor time to fathom a scientific proposition or a rhetorical statement to its elements. Pope said of him that he constituted "the wisest, brightest, and meanest of mankind."

BACON, Josephine Daskam, author, born at Stamford, Conn., Feb. 17, 1876. She graduated at Smith College in 1898, and five years later married Sheldon Bacon. Her writings consist largely of fiction and short poems. Among her books are "The Imp and the Angel," "Smith College Stories," "Whom the Gods Destroyed," "Middle Aged Love Stories," "The Madness of Philip," "Fables for the Fair," and "Memoirs of a Baby."

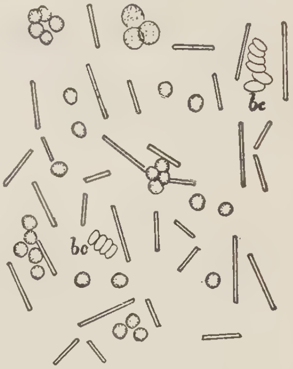
BACON, Leonard, clergyman, born in Detroit, Mich., Feb. 19, 1802; died Dec. 24, 1881. In 1820 he graduated from Yale, and in 1825 became pastor of the First Congregational Church of New Haven. From 1866 until 1871 he was professor of theology at Yale. He contributed many excellent articles to the *New Englander* and the *Christian Spectator,* and established the New York *Independent* in 1847. His son, Leonard Woolsey Bacon, was born in New Haven, Conn., Jan. 1, 1830. He studied at Yale and Andover, served as pastor in New York, and subsequently held charges in other cities. From 1872 to 1877 he studied in Europe, much of the time in Geneva, and after his return to America preached the gospel, wrote church hymns, and published numerous works on religion. His writings include "Sunday Observance and Sunday Law," "The Vatican Council," and "The Simplicity that is in Christ."

BACON, Nathaniel, colonial leader, born in Suffolk, England, Jan. 2, 1647; died in Virginia, Oct. 29, 1676. In 1670 he came to America, joining the Virginia settlement. He practiced law for some years, became a member of the governor's council and acted a prominent part in the early history of Virginia. In 1676 he put down an Indian uprising, and soon after became complicated with Governor Berkeley, who had restricted the franchise and instituted high taxation. He made an attack upon Jamestown, in which he was aided by many of the people, and compelled Berkeley to grant reforms. This is known in history as Bacon's Rebellion, and the laws dictated by him are described as Bacon's Laws. His premature death was followed by a repeal of the latter, and Berkeley caused some of the prominent participants in the affair to be executed.

BACON, Roger, an English monk, born in 1213; died in 1294. He entered the University of Oxford and later studied in Paris, where he received the degree of doctor of theology. He wrote an important work called "Opus Majus," in which he pointed out the need of nature and science studies in the schools. It was, in fact, an encyclopaedia of scientific subjects as well as a treatise on important topics and how to teach them. Bacon was one of the most profound and original thinkers of his time. He was acquainted with geography and astronomy, and added much of value to human knowledge. He was kept in confinement in France on account of suspicions held against him by his coworkers, who accused him of practicing magical arts. The time of his confinement occupied a period of over ten years. The Franciscan monks forbade the distribution of his books.

BACON'S REBELLION. See **Bacon, Nathaniel.**

BACTERIOLOGY (băk-tē-rĭ-ŏl'ō-gȳ), the division of botany that treats of *bacteria,* which are minute vegetable organisms. Few sciences have more practical value to mankind, since a knowledge of it tends to promote the protection of the human body, as well as that of plants and animals. There are many species of bacteria, some harmless and others harmful to man, but all are of more or less value in the economy of nature. They are extremely minute organisms, consisting of single cells; either single spherical, rod-shaped, oval, corkscrewlike, or of aggregates of such cells. They multiply by transverse division and by spores, some species increasing so rapidly that a single bacillus will produce several million new organisms in twenty-four hours. These forms of life are not only among the smallest, but also among the simplest. The spherical bacteria appear as mere specks of protoplasm under the microscope, in which it is impossible to detect either cell wall or nucleus. This class include the *micrococci,* many of which are colored, and some cause dreaded diseases in man and the lower animals. Such diseases include erysipelas and acute croupous pneumonia. Measles, yellow fever, cerebro-spinal meningitis, typhoid fever, diphtheria, leprosy, consumption, and tetanus are other diseases due to different forms of bacteria.



Bacilli as represented by Dr. Koch; *bc,* blood corpuscles.

Bacterium and *bacillus* are generic names of most of the straight-rod forms, *spirillum* is a long wavy form, and *vibrio* is a curved form. The form that causes the Asiatic cholera is shaped like the comma of punctuation, and is called *bacillus comma.* A form of bacillus about a third longer and more slender causes the disease known as consumption, and may be seen by examining the sputum of a consumptive. *Saprophytic bacilli* are organisms that live on dead organic matter. They are of great value in the economy of nature in that they resolve the tissues of dead matter into simple compounds, as water, ammonia, and carbonic acid, thus supplying these necessary substances for growing plants.

Bacteria are widely diffused in the air, water, soil, clothing, mucous membrane, and on the surface of bodies. The poisonous effect is due to the growth of bacteria, the poisons being known as *ptomaines,* or *saprophytic,* and *tox-albumins,* or *parasitic.* As an example of the former we have the poisoning caused by eating sausage and ice cream; and of the latter, the poisonous effect of the toxin to which diphtheria is due. The forms of bacteria which cause putrefaction are convenient in laboratory study, but different forms may be artificially cultivated.

For the study of the life history of these organisms, the bacillus of hay is commonly suggested. If a quantity of hay be moistened with water, it will become cloudy in a few days. The microscope will reveal an innumerable number of bacilli swimming in a drop of the water, but after several days the solution will become clear and all evidences of life cease. However, it will be found that long threadlike forms have gathered in the scum, each thread consisting of a number of cells. The cell walls of these threads break after some time and sink to the bottom along with the spores that have developed. These spores remain at rest as long as they are not taken out of the solution in which they are formed. They now constitute a jellylike mass, which is called the *zoogloea* stage. In this spore form the mass will stand drying, and small particles may be carried as dust in the atmosphere, thus giving rise to infection.

Most forms of bacteria are destroyed by boiling a few minutes, but some kinds, as certain bacilli, in the spore form resist a temperature of 212° Fahr. several hours. Bacteriology as a study had its beginning in 1675 when important discoveries were announced by Anthony Leeuwenhoek (1632-1723), a native of Delft, Holland. However, it was not fully grounded as a science until 1881, when Dr. Koch (q. v.) gave the world important reports of discoveries regarding bacillus tuberculosis, the causal agent in the disease tuberculosis.

BACTRIA (băk'trĭ-ȧ), or **Bactriana,** the name of an ancient country of Asia, located between the Amu or Oxus River and the Hindu-Kush Mountains. It is supposed to have been identical with the modern province of Balkh, and is regarded the native country of the Aryan people. In the 3d century B. C. Bactria was a powerful kingdom, and was ruled by a dynasty of Greek origin. Buddhism obtained a strong foothold at the beginning of the Christian era. Subsequently it became subject to Bokhara and with it passed under the dominion of Russia in 1868.

BADAJOZ (bä-dȧ-hōs'), a town in Spain, capital of a province of the same name, on the Guadiana River. It is near the boundary of Portugal, 130 miles east of Lisbon, with which it has connection by railway. An old cathedral, a Moorish castle, and several monasteries are among its buildings. The manufactures consist chiefly of delftware, woolens, and leather goods. Wellington captured it in 1812. Population, 1900, 30,899; in 1920, 33,160.

BADEN (bä'dĕn), a watering place in Austria, 15 miles southwest of Vienna. It is noted for the warm sulphur springs in its vicinity, whose temperature ranges from 72° to 97°. The town has a number of fine buildings and fashionable hotels, and near it is the royal hunting lodge known as Meierling. The springs were known in the time of the Romans and a number of coins and antiquities of Roman origin have been found in the vicinity. Population, 1923, 18,750.

BADEN, or **Baden-Baden,** a city of Germany, in the duchy of Baden, famous as a summer resort. It is situated eighteen miles southwest from Carlsruhe, on the hills of the Black Forest. Near it are some of the most noted and healthful thermal baths in Europe. These cause it to be visited by many thousands annually. The city is well known in history, having been founded by the Roman Hadrian in the 2d century, when it was known as Civitas Aurelia Aquensis (watering-place of Aurelius). Its springs were famous throughout the Middle Ages, and long attracted all classes who were in search of pleasure or health. The springs have a temperature of from 100° to 150°, and discharge about 4,500 cubic feet of water daily. The water is used for bathing, manufacturing, and shipping purposes. It is applied medicinally in cases of gout, skin diseases, rheumatism, and other ailments. The city has fine public promenades and gardens, and the highways are ornamented with flowers and foliage. From the heights near the city may be seen the waters of the Rhine. Population, 1920, 22,066.

BADEN, Grand Duchy of, a state in the southwestern part of Germany. It is bounded on the north by Bavaria and Hesse-Darmstadt, east by Wurttemberg and Bavaria, south by Switzerland, and west by Rhenish Bavaria, Alsace, and Lorraine. Toward the south of it flows the Rhine, which separates it from Switzerland. The area is 5,821, exclusive of Lake Constance, and in size it takes fourth rank among the states of Germany. It contains the Black Forest, or Schwarzwald, on the highlands of the southern part, and its northern portion is a plain. The drainage is to the North Sea by the Rhine, and to the Black Sea by the Danube. The soil is fertile, especially along the Rhine valley. Its highlands abound in valuable minerals, including iron, zinc, coal, nickel, salt, and limestone. Mineral and thermal springs are abundant at Baden and in the highlands.

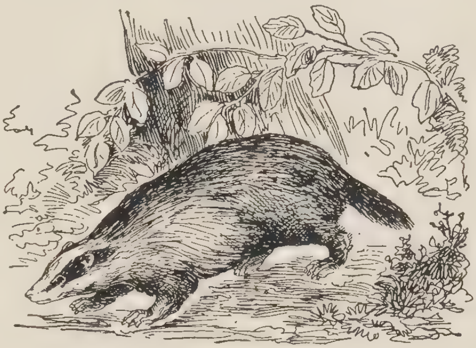
Baden is governed under a constitution that dates from 1818, and by which the sovereignty is vested in the eldest of the male line. The grand duke and one-third of the inhabitants are Protestants, while two-fifths are Roman Catholics. Two universities are maintained at Freiburg and Heidelberg, with an attendance of 2,500 students, and the public school system is on a popular and progressive basis. The state has extensive railroad lines, well built highways, many manufacturing cities, and large vineyards. The manufactures consist of woolen and silk goods, beet sugar, musical instruments, machinery, wine, soap, and earthenware. Large interests are vested in the manufacture of clocks, employing about 12,000 people. The government of the state is under a duke and a Parliament located at Carlsruhe; the latter consists of two departments, but is limited in its legislative powers by the constitution of the German Republic.

In early history Baden was inhabited by savage tribes classed with the Alemanni, who were subdued by the Romans under Hadrian. The controlling house now in power began in the 11th century. In 1815 Charles Ludwig joined the German Confederation, in which Baden held the seventh rank. In 1866 it sided with Austria against Prussia, but was united soon after with the North German States. When the Franco-Prussian War broke out, in 1870, Baden took an active part against France, and was restored to the German Empire on Nov. 15, 1871. Carlsruhe is the capital, and Mannheim is the chief commercial center. Population, 1920, 2,141,832.

BADEN-POWELL (bā'den-pō'el), **Sir George Smyth,** author and diplomat, born at Oxford, England, Dec. 24, 1857; died Nov. 20, 1898. He was educated at Baliol College, Oxford, traveled extensively in New Zealand and Australia, and contributed to various periodicals, among them the London *Times.* In 1887 he became private secretary to the governor of Victoria, traveled in the West Indies in 1880-81, and in 1885 was elected to Parliament as a Conservative. The following year he was sent to Canada to draw up reports on the fisheries question, the issues of which were settled in 1891. He was knighted for his services to the public in publishing reports on the West Indies. His numerous writings include "Protection and Bad Times," "Truth about Home Rule," "State Aid and State Interference," and "Saving of Ireland, Industrial, Financial, Political."

BADGE (băj), a mark, sign, or token worn on the dress to show the relation of the wearer to the government, or to some society or organization. It is either conferred by the State or assumed by the individual for the purpose of distinction. The garter of the English knight was conferred by public authority, so also were the golden fleece of the Spanish grandee and the button of the Chinese mandarin. Societies, as the Good Templars, the Grand Army of the Republic, and civic societies, confer badges as marks of distinction. Many conventions, notably those of political parties, authorize badges as a symbol to distinguish delegates claiming seats.

BADGER (băj'ẽr), a quadruped mammal common to America and Eurasia. It is clumsy and awkward in its movements. The legs are thick and short and the feet are straight, while the forefeet are armed with long claws. Among the typical species are the American, the European, and the balisaur, or sand badger, of India. The American badger is grizzled-gray with one or more white stripes on the face. It is about two feet long, including the tail, which is short. It burrows in the ground and spends the days in sleeping, but comes out at night to feed upon roots, small animals, and insects. Its fur is a valuable article of commerce and its flesh is eaten. This animal was once very abundant in Wisconsin, hence its popular name—Badger State. The European badger resembles the American in size and color, but the balisaur is larger and resembles a small bear.



EUROPEAN BADGER.

BAD LANDS (băd lăndz), a region of North America, situated principally in the upper drainage basin of the Missouri River. The section of country designated as bad lands is made up largely of sand and gravel, with here and there rocks and irregular horizontal strata of clay and limestone, and is peculiarly destitute of vegetation. The rainfall is scant, though small grasses are met with in some sections, and in others the vegetation consists largely of sage brush. Medora, N. D., is surrounded by bad lands, and from that point they extend north and south. Tracts of considerable size that may be classed as bad lands occur in the vicinity of the Black Hills, and in some sections of Texas, New Mexico, Arizona, Nebraska, and Colorado.

BAFFIN (băf'fĭn), **William,** navigator, born in London, England, in 1584; died May 23, 1622. He accompanied James Hall in 1612 on an Arctic expedition, and in 1616 discovered Baffin's Bay. He wrote an account of his travels and explorations and prepared maps and tables of the regions in the Arctic visited by him. In 1622 he took part in an expedition against the Portuguese and was killed at the siege of Ormuz, in the Persian Gulf.

BAFFIN BAY, a gulf or sea on the northeast coast of North America, extending between British America and Greenland. It is about 800 miles long, has an average breadth of 280 miles, and a depth of about 7,000 feet. It is connected with the Atlantic Ocean by Davis Strait, and with the Arctic Ocean by Lancaster and Smith sounds. Through it pass currents to the south, but at least one is known to move northward around Cape Farewell. The tide waters rise about ten feet. Its shores are steep and lofty, and are inhabited by fur-bearing animals common to the northern climates, and thousands of gulls and sea-fowls. It was discovered in 1616 by William Baffin, after whom it was named. It is navigable only four months in the summer, owing to its waters being frozen. The bay is valuable for whale fishing, and the adjacent region is rich in minerals and fur-bearing animals.

BAFFIN LAND, an island west of Greenland, a colonial possession of Great Britain, and a part of the Canadian district of Franklin. The climate is severe, similar to that of Greenland, and the surface is mountainous. Along the coasts are a few settlements of Eskimos, but there are few inhabitants and the area is unknown.

BAGATELLE (băg-a-tĕl′), a game played on a cushion-rimmed table with a cue and spherical balls. It resembles billiards. The table is about seven feet long and three feet wide. Nine cups or sockets large enough to receive the balls are at the end, and the game consists of driving the balls into the openings.

BAGDAD (bäg-däd′), or **Baghdad,** the seat of government of a vilayet of the same name, in the southeastern part of Asiatic Turkey. It is situated on the banks of the Tigris River, which is crossed by several pontoon bridges. The city is surrounded by a wall forty feet high, with four gates, and is otherwise well fortified. It was founded about 762 A. D., and built of material taken from the ruins of Seleucia. The streets are mostly narrow and illy paved, but some of the bazaars are large depositories of Asiatic and European manufactures. Among the chief buildings are the citadel, the governor general's palace, and many mosques. Bagdad was enlarged in the 9th century by Harun-al-Rashid, who built a palace for himself, and a tomb for his favorite wife, Zobeide. He erected numerous edifices and bridges. In the 10th century it was ravaged by the Turks, and in the 14th century by Timour. Subsequently it passed over to Persia, and then back to the Turks, who have had it under sway since the 18th century. The inhabitants engage largely in trade and produce a variety of manufactures, such as silk, carpets, drugs, and ornaments. They consist chiefly of Turks, Arabs, Jews, Hindus, Afghans, Persians, and Armenians. The city is important on account of its location on the Tigris, which affords a highway for navigation to the sea and many interior points. It forms the principal telegraphic connection between Western Asia and British India. Its manufactures are developing under European stimuli, and it is the seat of a large trade. The British, under General Maude, captured it in 1917. Population, 1922, 232,675.

BAGEHOT (băg′ŭt), **Walter,** economist and publisher, born in Langport, England, Feb. 3, 1826; died March 24, 1877. He studied at the University College, London, where he won distinction in philosophy and political economy. In 1848 he was admitted to the bar, but instead of practicing that profession he went into the banking business with his father. He contributed to several periodicals, including *The Economist,* a free-trade organ, and was regarded as an authority on finance and banking. His chief publications are "Estimates of Some Englishmen and Scotchmen," "Count Your Enemies and Economize Your Expenditure," "The English Constitution," "Lombard Street," and "Physics and Politics."

BAGPIPE (băg′pīp), a musical instrument of unknown antiquity. Up to the 18th century it was used in all the countries of Eurasia, and it is still popular in Scotland, France, Spain, Italy, and many countries of Asia. It consists of a leather bag, generally covered with cloth, which is inflated by the player blowing with his mouth through a tube. Three or four pipes are connected with the bag, through which the wind is forced by pressing the bag under the arm. The player uses one of the pipes, called the *chanter,* which is supplied with finger holes, and serves for playing the tune. The three or four others, called *drones,* sound a continuous low tone. The instrument is still used extensively by Asiatic people, and is seen at all the great expositions where Turks and others make exhibits.

BAHAMA (bȧ-hā′mȧ), a group of islands in the West Indies, nearly 600 miles long, and located southeast of the coast of Florida. The total area is 5,450 square miles. The group includes nearly 700 islets and islands and over 2,000 coral reefs. Among the principal islands are Andros, New Providence, Grand Bahama, Great and Little Abaco, Crooked Island, Great Exuma, San Salvador, or Watling Island, Great Inagua, and Harbor Island. About twenty of the islands are inhabited. The leading products include cotton, sugar, maize, cocoanuts, sponges, and a great variety of fruits. In recent years the culture of sisal fiber has been largely developed and is a growing industry. The exports from these islands aggregate about $1,050,500 annually; the imports, $1,725,525. Mail steamship service is maintained among the islands and with American and European ports. Many of the islands are noted for their fine climate and are visited by tourists and pleasure seekers. The history of the Bahamas dates from Oct. 12, 1492, when Columbus discovered them, the first land viewed by him in America. These islands now form a British colony. The government is administered by a local department under the direction of the English Parliament. Nassau, on New Providence, is the capital. In 1921 the entire group had a population of 55,735.

BAHIA (bȧ-ē′ȧ), or **São Salvador,** the second city of Brazil, on the Bay of All Saints, and capital of the province of Bahia. It occupies a fine site, and has one of the most commodious harbors in the world. The principal streets are substantially paved with stone and asphalt, and the city has gas and electric lights, drainage, and waterworks. It is the seat of a university, an arsenal, and the palace of an archbishop. It has railroad connection with the interior, and submerged telegraphic communication with Europe. Intercommunication is provided by an extensive system of electric railways, with which suburban and interurban lines are connected. The manufactures include leather, tobacco, sugar, clothing, lumber products, and machinery. It has a large export trade in cotton, sugar, rice, live stock, minerals, and fruits. Bahia was founded in 1549 and was the capital of Brazil until 1763. Population, 1906, 230,120; in 1919, 252,684.

BAHIA HONDA (ŏn′dȧ), a seaport of Cuba, in the province of Pinar del Rio, about 56 miles west of Havana. The harbor is about two miles distant and is one of the best in Cuba. It is five miles long by three miles wide, with an average depth of 28 feet. The surrounding country produces sugar cane and has copper and coal mines. Population, 1921, 1,680.

BAHR (bâr), **Herman,** author and journalist, born at Linz, Austria, in 1863. After securing a liberal education by attending universities at Vienna, Gratz, and Berlin, he traveled extensively and returned to Vienna, where he made his permanent residence. He became associate editor of the *Free Stage* in 1890 and subsequently was editor and critic of several periodicals. In 1894 he founded *The Times,* in which enterprise he became known as an acute critic and a skillful writer. The numerous books published by him include "New Studies," "Critic of the Modern," "The Good School," "The Newer Mankind," and "The Home-like Wife."

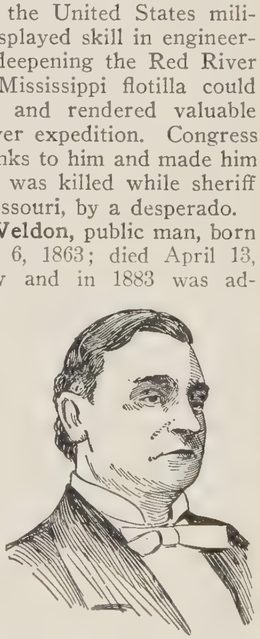
BAIAE (bī′ē), or **Baja,** an ancient town of Italy, located on a bay in Campania, 10 miles west of Naples. In the time of the Romans it was popular as a watering place and contained the villas of many wealthy citizens, who were fond of its pleasant climate and warm mineral springs. The society of Baiae was noted for its luxury and dissolution. Many ruins of Roman baths and temples are on the site of the town.

BAIKAL (bī-käl′), a large fresh water lake in Siberia, near the Chinese frontier, about 400 miles long and from ten to fifty miles wide; area, 14,000 square miles. The greatest depth is 4,500 feet. It is located among great mountain peaks, which yield valuable minerals. In the summer season large vessels sail upon it, and in winter it is crossed on the ice. Salmon, pike, sturgeon, and seals abound. Immediately south of the southern shore passes the great Trans-Siberian railway from Saint Petersburg to Vladivostock, and on its southwestern coast is the city of Irkutsk, the seat of a government of the same name. The Angara River, a tributary of the Yenisei, is the outlet of Lake Baikal.

BAILEY (bā′lĭ), **James Montgomery,** journalist, born in Albany, N. Y., Sept. 25, 1841; died March 4, 1894. He worked at the trade of a carpenter for some time, served as a volunteer in the Civil War, and in 1870 established the *Danbury News,* in which he published many humorous sketches and made his paper known throughout the country. In 1873 he published "Life in Danbury," which consisted chiefly of articles selected from his newspaper. Other books published by him are "England from a Back Window," "Mr. Phillips's Goneness," and "The Danbury News Man's Almanac."

BAILEY, Joseph, soldier, born in Salem, Ohio, April 28, 1827; killed in Missouri, March 21, 1867. He entered the United States military service in 1861, displayed skill in engineering the enterprise of deepening the Red River in Louisiana so the Mississippi flotilla could pass over the rapids, and rendered valuable service in the Red River expedition. Congress extended a vote of thanks to him and made him brigadier general. He was killed while sheriff of Newton County, Missouri, by a desperado.

BAILEY, Joseph Weldon, public man, born in Copiah, Miss., Oct. 6, 1863; died April 13, 1929. He studied law and in 1883 was admitted to the bar. In 1884 he was elected a presidential elector on the Democrat ticket, and the following year removed to Gainesville, Tex., where he practiced law. He was a presidential elector at large in 1888 and in 1891 was elected to Congress, serving continuously until 1901, when he was elected to the United States Senate for a full term, and was reëlected in 1908. His influence in State and national


JOSEPH WELDON BAILEY.

politics has been recognized by all parties. He resumed the practice of law in 1913.

BAILEY, Philip James, poet, born at Basford, England, April 16, 1816; died in 1902. He studied at Glasgow and was admitted to the bar, and in 1839 published his most popular poem, entitled "Festus." This poem was widely read because of containing pleasing passages and being written in a fine style of rhetoric. His later publications are "The Mystic," "The Angel World," and "The Universal Hymn."

BAIN (bān), **Alexander,** metaphysical writer, born in Aberdeen, Scotland, in 1818; died Sept. 18, 1903. He was educated in his native town and was for a time professor of natural philosophy at Anderson University in Glasgow. In 1860 he was made regius professor of logic in the University of Aberdeen, in which institution he became lord rector in 1881. For some time he was examiner in logic and moral philosophy in the University of London. Besides contributing to *Westminster Review* and Chamber's *Papers for the People,* he published numerous works on psychology. Many of his writings and several text-books on psychological subjects have been read extensively in Canada and the United States. His principal writings embrace "Emotions and the Will," "Mental and Moral Science," "Relation of Mind and Body," "Senses and Intellect," "Study of Character," and "Compendium of Psychology and Ethics."

BAINBRIDGE (bān'brĭj), **William,** naval officer, born at Princeton, N. J., May 7, 1774; died in Philadelphia, July 28, 1833. At the age of eighteen years he was mate, and the next year became captain of a merchant vessel. In 1798 an appointment as lieutenant commandant was given him, and in 1800 he became commander of the frigate *George Washington,* which conveyed the commercial tribute levied by the dey of Algiers. He commanded the *Essex,* which cruised in the Mediterranean, and later the *Philadelphia* in the war with Tripoli in 1803. In the War of 1812 he commanded the squadron consisting of the *Hornet, Constitution,* and *Essex.* On December 26 of that year he captured the *Java* off the coast of Brazil. For this service the crew was voted $50,000 by Congress as prize money and he received a gold medal. Later he commanded the Mediterranean squadron, and became president of the board of navy commissioners.

BAIRD (bârd), **Spencer Fullerton,** naturalist, born at Reading, Penn., Feb. 3, 1823; died at Wood's Holl, Mass., Aug. 19, 1887. His education was secured at Dickinson College, Penn., where he taught natural history for ten years. Subsequently he became secretary of the Smithsonian Institution at Washington, and later chief government commissioner of fish and fisheries. He was the recipient of many medals from societies and governments, both American and European. His writings include "A Catalogue of North American Serpents," "Review of North American Birds," "Mammals of North America," and "Iconographic Encyclopaedia."

BAIREUTH (bī-roit'), or **Bayreuth,** a city of Germany, in Bavaria, 40 miles northeast of Nuremberg. It is located on the Red Main River, has a railway connecting it with Munich, and its streets are straight and well improved. The chief buildings include an opera house, an art gallery, the town hall, and several churches. It was the residence of Richard Wagner, Franz Liszt, and Jean Paul Richter, who are buried in its grounds, and a fine monument of Richter stands in one of the principal streets. The city is famous for its Festival Theater, erected with the assistance of Louis II. of Bavaria, and in it are performed classical plays and musical selections from Wagner. Baireuth has manufactures of textiles, machinery, sewing machines, and musical instruments. Population, 1923, 38,633.

BAKER CITY, a city in Oregon, county seat of Baker County, on the Powder River, and on the railway of the Oregon Railroad and Navigation Company. The chief buildings include the Masonic temple, the high school, the county courthouse, and a natatorium. The city has waterworks, sewerage, and a considerable trade. The surrounding country is fertile, producing fruits, cereals, and live stock. It is surrounded by a region that contains large interest in gold mining, and has manufactures of brick, lumber products, machinery, and dairy products. It was settled in 1860 and incorporated in 1872. Population, 1920, 7,729.

BAKER (bā'kẽr), **Edward Dickinson,** soldier and statesman, born in London, England, Feb. 24, 1811; slain in battle Oct. 21, 1861. He came to America at an early age, attended public schools, and was admitted to the bar. When quite young he began the practice of law at Springfield, Ill., where he was elected to the State Legislature, both as Representative and Senator, and for two terms as a member of Congress. He was killed while at the head of his brigade of Union troops at Ball's Bluff, Va.

BAKER, Newton Diehl, public man, born in Martinsburg, W. Va., Dec. 3, 1871. He graduated at Johns Hopkins University, studied law, and began a successful practice in his native state. In 1898 he removed to Cleveland, Ohio, where he was elected city solicitor, and to other important positions. In 1916 he was made Secretary of War by President Wilson, succeeding Secretary Garrison, resigned.

BAKER, Sir Samuel White, explorer and author, born in London, England, June 8, 1821; died Dec. 30, 1893. His first enterprise was the establishment of a colony at Newera Ellia, Ceylon, in 1847, of which he wrote interesting accounts called "Eight Years' Wanderings in Ceylon." He organized an expedition in 1861 to explore the source of the Nile. This enterprise led to the discovery of Lake Albert Nyanza in 1864, and an exploration of the Blue Nile and White Nile. He wrote "Lake Albert Nyanza," "Wild Beasts and their Ways," and "The Rifle and the Hound in Ceylon."

BAKERSFIELD, county seat of Kern County, California, 85 miles northwest of Los Angeles, on the Kern River, and on the Santa Fé and the Southern Pacific railroads. The features include the court house, Masonic Temple, city hall, high school, federal building, public library, and asphalt paving. It has railroad shops, foundries, and large commercial interests. The surrounding country produces gas, oil, and agricultural products. Population, 1920, 18,638.

BAKING, the art of preparing food in a chamber or oven. It differs slightly from broiling and roasting. For domestic use the heat is usually supplied by burning wood or coal, but gas, steam, and heated water are used to a large extent. The oven for baking is closed, but should be well ventilated. The term is sometimes applied to the hardening of porcelain and brick, when subjected to heat, but burning is more commonly applied.

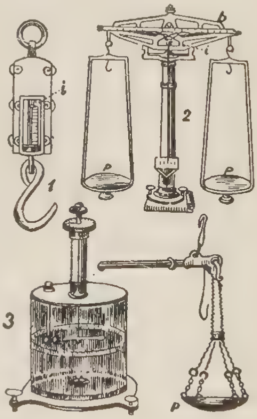
BAKING POWDER, a substitute for yeast used in baking. It consists of tartaric acid, bicarbonate of soda, and potato or rice flour. The flour is added to keep the powder dry, but the ingredients are first dried separately and afterward mixed. When baking powder is added to flour, in making bread or biscuits, the carbonic acid gas is liberated by the action of the water used in the process, and this gives it the requisite lightness by puffing or blowing up the doughy mass. Bicarbonate of ammonia is sometimes used instead of bicarbonate of soda, which is objected to as injurious to the health. In some cases alum is similarly substituted. Both are objectionable adulterations.

BAKU (bä-kōō′), a port city of Russia, in the government of Baku, on the western shore of the Caspian Sea. The city is strongly fortified, has a fine harbor, and is the terminus of the Trans-Caucasian Railway. Most of the buildings are low and flat, but there are a number of fine schools and churches, several government structures, and extensive dock and harbor improvements. The exports include salt, opium, cotton, live stock, silk, and saffron. The manufactures embrace machinery, ships, ironware, pottery, clothing, tobacco products, and salt. Baku is one of the most noted centers of trade in petroleum and naphtha in the world. About 500 petroleum wells are in its vicinity, most of which are eight or nine miles north of the city. The annual production of crude petroleum aggregates 9,225,000 tons. Some of the wells have been flowing fully two thousand years, but the larger ones are the result of deep borings made within recent times and are pumped by machinery. The waste is used for fuel in manufacturing enterprises and to generate steam on railways and vessels. A pipe line 600 miles long conveys oil from Baku to the Black Sea. Some of the wells emit inflammable gases, and have been the objects of pilgrimages of the Guebers or Fire Worshipers. Population, 1921, 248,865.

BALAAM (bā′lăm), the son of Beor, prophet of Pethor, who lived in Aram on the River Euphrates. Balak, King of Moab, hired him to curse Israel, but instead he blessed that nation and foretold for it a great future. Later Moab, at the instigation of Balaam, invited the Israelites to worship the god Baal Peor. In punishment of this transgression the Israelites were visited by a plague, and afterward they fought against the Moabites and Balaam was slain. Mention is made of Balaam in Num. xxi and xxiv and in Joshua xiii.

BALAKLAVA (bȧl-ȧ-klä′vȧ), a small port on the Black Sea, in the southwestern part of the Crimea, Russia, near Sebastopol. It was the headquarters of the British during the Crimean War, and from which they undertook the construction of a railroad to Sebastopol, a distance of about six miles. The harbor affords secure anchorage for the largest ships. It is a natural fort, the entrance being so narrow that only one vessel can pass into it at a time. The Russians made an attack upon it Oct. 25, 1854, but were repulsed. The famous charge of the light brigade of 600 men under Lord Cardigan took place at this time. They cut their way with great bravery to the Russian guns, and afterward cut their way back again. In the charge all but 150 perished. Tennyson's "Charge of the Light Brigade" was written in commemoration of this daring, but misdirected deed.

BALANCE (băl′ȧnce), an instrument used to ascertain the relative weight or masses of bodies. There are various forms, but the most common are *hydrostatic balances*, *torsion balances*, and *steelyards*. The hydrostatic balances are used to ascertain the specific gravity of water; torsion balances, to ascertain the intensity of very small forces; and steelyards, for weighing both small and large articles. *Spring balances* are used to weigh articles in which a high degree of exactness is not required. They are constructed of a device whereby a spring is drawn out or compressed to register the weight.



BALANCES.

1. Spring balance. 2. Chemical balance. 3. Coulomb's torsion balance. 4. Antique Roman balance from Pompeii. *b*, beam; *i*, indicator; *p*, pan.

BALANCE OF POWER, an expression used to indicate the condition under which a party in a Legislature or Congress has sufficient votes to secure the passage of a measure by casting them in favor of either one of two or more parties. The term is used in diplomacy among nations to indicate a condition whereby the influence of one or more may be cast so as to overcome the influence of other powers by a preponderance of strength. Thus, some of the European states cast their influence against Spain, then against France, and subsequently against Russia, whereby the balance of power was sufficient to secure certain concessions or to establish and maintain conditions of independence for other governments. Among the notable instances in which the balance of power was maintained in Europe may be cited the coalition formed against Napoleon I., in 1814, the concerted action to check the ambition of Russia in the Crimean War, and the conclusion of the Treaty of Berlin, in 1878, to maintain the autonomy of the Balkan States.

BALATON (bŏ′lŏ-tôn), or **Platten,** a lake in Hungary, located 55 miles southwest of Budapest. It is seven miles wide and fifty miles long, and has an area of about 450 square miles. A number of small streams flow into it, and the outflow is through the Sio River, the Kapos River, and the Kapos Canal into the Danube. Many edible species of fish are common to the lake.

BALBOA (bȧl-bō′ȧ), **Vasco Nuñez de,** eminent conqueror, born in Xeres-de-los-Caballeros, Spain, in 1475; executed at Santa Maria in 1517. He was born of a once noble family, and in early youth took part in several expeditions to the New World. In Santo Domingo he spent a number of years on a plantation, but after several financial reverses he smuggled himself on board a ship in order to accompany Darien on expeditions. He crossed the Isthmus of Darien in 1513, and on Sept. 25 of that year first viewed the Pacific Ocean. Subsequently he obtained information about Peru, which he annexed to Spain. He was afterward appointed viceroy of the South Sea and married the daughter of Davila, who had been appointed governor of Darien. Davila was jealous of his success and had him beheaded on a charge of disloyalty. Pizarro, the conqueror of Peru, served under Balboa for some time.

BALDER (bạl′dẽr), in Scandinavian mythology, the son of Odin and Frigga. He personified the brightness of summer, and was supposed to spread light and beauty upon mortals. It is said that the gods amused themselves by shooting arrows and throwing stones at Balder, who was invulnerable to them, until Loki, the god of evil, aimed an arrow of mistletoe at the blind god Hodur and instead killed Balder. The story goes on to say that he is to return after Ragnarok, a period of twilight, and bring to mortals the golden age. Richard Wagner made use of this myth in his "Nibelungen," a series of dramatic pieces.

BALDWIN (bạld′wĭn), the name of five kings of Jerusalem, who descended from the counts of French Flanders. Baldwin I. accompanied his brother, Godfrey de Bouillon, on the first Crusade to the Holy Land. He was born in 1058, became King of Jerusalem in 1100, and died in 1118. His cousin succeeded him in 1118 as Baldwin II., who died after a successful reign in 1131. Baldwin III. was a grandson of Baldwin II., and reigned as King of Jerusalem in 1143-62. Baldwin IV. was a son of Amalric and a nephew of Baldwin III. He succeeded to the throne in 1173, but in 1184 caused his infant son to be crowned as Baldwin V., who died in 1186. The power of Christianity began to decline in the East with the death of Baldwin III., who was regarded the bravest and most honorable of the Crusaders.

BALDWIN, Charles H., naval officer, born in New York City, Sept. 3, 1822; died Nov. 17, 1888. He entered the navy as a midshipman in 1839 and served through the Mexican War. In 1862 he commanded the steamer *Clifton* of of the mortar flotilla at the time Farragut's fleet passed Forts Jackson and Saint Philip. He retired from service in 1884.

BALDWIN, James Mark, psychologist, born in Columbia, South Carolina, Jan. 12, 1861. After graduating at Princeton in 1884, he studied in the universities of Berlin, Leipsic, and Tübingen, and was instructor of German at Princeton in 1886-87. Besides founding the *Psychological Review,* he published a number of books. Among them are "Elements of Psychology," "Hand Books of Psychology," and "Social and Ethical Interpretations of Mental Development."

BALDWIN, Matthias William, inventor and manufacturer, born in Elizabethtown, N. J., Dec. 10, 1795; died Sept. 7, 1866. He first devised a new process for bookbinding, and afterward turned his attention to machinery. In 1832 he completed the *Ironsides,* which was the first practical locomotive made in America, and was exhibited as such at the Chicago Columbian Exposition in 1893. He founded the Baldwin Locomotive Works in Philadelphia.

BALDWIN, Stanley, British statesman, born Aug. 3, 1861. He graduated at Cambridge and became interested in politics. In 1908 he entered Parliament, became secretary of the treasury in 1917, and succeeded Bonar Law as prime minister in 1923. The Conservatives being defeated in 1923, he was succeeded by J. Ramsay Macdonald, but was again elected prime minister after the defeat of the labor party in 1924. He continued in this office until 1929, when the labor party again was successful and J. Ramsay Macdonald succeeded him as premier.

BALEARIC ISLANDS (băl-ę-ăr′ĭk), a

group of islands in the Mediterranean Sea, off the east coast of Spain. They include Majorca, Minorca, Iviza, Formentera, Cabrera, and several others. The total area is 1,860 square miles. Majorca is much the largest of the islands; its area is 1,430 square miles. Palma, on Palma Bay, in the southwestern part of Majorca, is a fine city, the largest in the islands, and has a population of 63,937. These islands were visited by the Greeks before the rise of Roman power. They were long subject to Carthage, and in 123 B. C. became part of the Roman Empire. James I., King of Aragon, held them in 1220-34, and in 1375 they became united to Spain. They are a Spanish possession at the present time and constitute a province of that kingdom. The soil is productive and yields large quantities of cereals and tropical fruits, especially olives, bananas, and grapes. Population, 1920, 311,649.

BALFE (bălf), **Michael William,** musician and composer, born in Dublin, Ireland, May 15, 1808; died in London, Oct. 20, 1870. He studied music in Italy and gained fame in performances at Milan, Paris, and in England. His best known operas are "The Bohemian Girl," "The Puritan's Daughter," "The Sleeping Queen," "The Rose of Castile," "The Siege of Rochelle," and "The Enchantress."

BALFOUR (băl'fûr), **Arthur James,** statesman, born in Scotland, July 25, 1848. He succeeded to his father's estate of Whittinghame in Haddingtonshire. His education was received at Eton and Cambridge, and he entered Parliament in 1874 as a member of the Conservative party from Hertford. He attained a quickness of perception and readiness of debate that soon attracted public attention. In 1878 he became secretary to Lord Salisbury, and later private secretary in Lord Beaconsfield's ministry, whom he accompanied to the Berlin Congress. During the ministry of Gladstone he became prominent in parliamentary discussions and later leader of the house. In 1902 he succeeded Lord Salisbury as prime minister of England, but his party was removed from power by the victory of the Liberals in 1906. He represented England at the Washington Conference in 1921. He is the author of a work entitled "The Foundations of Belief," which has been extensively read, and of "A Defense of Philosophic Doubt" and "Economic Notes on Insular Free Trade."

BALFOUR, John Hutton, botanist and physician, born in Edinburgh, Scotland, Sept. 15, 1808; died Feb. 11, 1884. He was a nephew of Hutton, the theologist, and professor of botany at Glasgow and Edinburgh. Besides contributing to current periodicals and works of reference, he published a number of books on botany and organized the Botanical Society of Edinburgh. His chief books are "Manual of Botany" and "Class-Book of Botany."

BALI (bä'lē), an island in the East Indies, located east of Java, and a colonial possession of the Netherlands. It has an area of 2,060 square miles. The surface is mountainous and volcanic, but the coast and valleys are fertile and the climate is healthful. Among the chief products are sugar, rice, tobacco, cotton, indigo, and fruit. The natives are Malayan and adhere to the Brahman religion. Population, 680,000.

BALIOL (bā'lĭ-ŭl), **John de,** Scottish king, born in 1249; died in 1315. He was chosen King of Scotland by Edward I. of England, to whom the question of who should occupy the throne had been submitted for adjustment after a competition between him and Robert Bruce. However, he became subject to the King of England, but in 1295 made a treaty with France with the view of throwing off English sovereignty, which resulted in his imprisonment by Edward I. In 1302 he was allowed to settle on his estates in Normandy, where he died. His father, Sir John Baliol, founded Baliol College in Oxford. His son, Edward Baliol, became King of Scotland on Sept. 24, 1332, but was deposed after a reign of three months, and died in England in 1363.

BALKAN (bȧl-kän'), anciently called *Haemus,* a range of mountains in Eastern Europe, which includes the Montenegro, Herzegovina, and Dinaric Alps, but the name is commonly applied only to the mountains extending through Bulgaria. The elevations are from about 4,000 to nearly 10,000 feet. Tchar-dagh, in the western part, is the highest peak; elevation, 9,700 feet. The mountains are crossed by highways and several railroads, and yield minerals, lumber, and vegetation. They form the watershed between the Lower Danube and the streams flowing into the Aegean Sea.

BALKAN FREE STATES, a term applied to the independent states of Rumania, Servia, and Bulgaria (including Eastern Rumelia), located on the Balkan peninsula, a region of Europe lying between the Black and Adriatic seas. The Balkan peninsula properly includes parts of Albania, Austria, and Montenegro.

BALKH (bälk), a town in Afghanistan, on the Balkh River. It is surrounded by a fertile country and has considerable trade in produce, carpets, and shawls. Timur destroyed the larger part of its buildings and it was plundered in 1825. It has not been improved to any extent since that time. Anciently the site was occupied by the city of Bactra. Population, about 12,000.

BALKHASH (bȧl-käsh'), or **Balkash,** a large lake in Siberia, the fourth in size of the lakes in Russian Asia. In breadth it varies from six miles to fifty miles; length, 330 miles; and area, 8,500 square miles. The lake is 780 feet above sea level, is salty, and has no outlet. A navigable stream, the Ili River, and several others, flow into it. The lake is quite shallow, ranging from 30 to 80 feet in depth and its fisheries are not important.

BALL (ba̤l), a game in which a spherical body is thrown, rolled, or struck with a mallet. As an outdoor exercise it is a very healthful and popular amusement, and it is extensively played for financial profit and to test skill. The different games of ball include baseball, football, cricket, basketball, polo, golf, lawn tennis, etc. Mention is made in the "Odyssey" of games played with balls by both sexes, and ball playing was popular in the gymnasia of Greece and at the baths of Rome. In the 16th century the game became fashionable in the courts of Europe. Lacrosse is a game originated by the Indians of North America. Cricket is much played by the English, and baseball is the most popular game in the United States.

BALL, Thomas, sculptor, born in Charlestown, Mass., June 3, 1819. He attended the Mayhew school in Boston and began painting in 1840, but after 1851 gave his time exclusively to sculpturing. For several years he resided at Florence, Italy. His chief works are busts of Daniel Webster and Jenny Lind and the group in Washington, D. C., entitled "Emancipation." He made bronze statues of Webster and Washington, the former in Central Park, New York, and the latter in the Boston Public Garden. He died Dec. 11, 1911.

BALLAD (băl'lad), a poem much briefer and less elaborate in composition than an epic. Ballads were written by nations whose life was simple and in which learning was not so far advanced as to facilitate more elaborate poems. Before the revival of letters native ballads were highly appreciated, even by persons of culture and rank, and the bard was held in esteem in the home and at social entertainments. Some of the ballads that are best known include Scott's "Minstrelsy of the Scottish Border," Goldsmith's "Edwin and Angelina," "Little Guest of Robin Hood," and "Chevy Chase." The "Niebelungenlied" is a famous German ballad.

BALLANTYNE (băl'lan-tīn), **James**, printer, born in Kelso, Scotland, in 1772; died Jan. 17, 1833. He published the *Kelso Mail* in his native town, and in 1802, at the suggestion of Sir Walter Scott, removed to Edinburgh, where he established a large printing plant. The works of Scott were printed by Ballantyne, and it is certain that he read the proofs both for technical details and with a view of suggesting criticisms. When Scott became embarrassed financially and failed, Ballantyne lost heavily.

BALLANTYNE, James Robert, orientalist, born at Kelso, Scotland, in 1813; died in 1864. He went to India at an early age, where he had charge of a military school at Benares, and afterward was professor of moral philosophy in the same institution. Subsequently he returned to England and was librarian of the East India office. He published "Catechism of Sanskrit Grammar" and a number of other works relating to the oriental languages.

BALLANTYNE, Robert Michael, author, born in Edinburgh, Scotland, in 1825; died Feb. 8, 1894. He was a prolific writer of stories for young people. In 1848 he published his first book, in which he gave his own experiences in the frontier of Rupert's Land. His stories number about 62 and were published in 1887 in 74 volumes. Among his best stories are "The World of Ice" and "The Coral Island."

BALLARAT (băl-là-răt'), a city of Australia, in the State of Victoria, and next to Melbourne the largest city in that subdivision of the Australian Commonwealth. It is located 90 miles northwest of Melbourne, has good railroad connections with other cities, and is in the center of a productive gold field. The largest gold nugget ever discovered was found near this city in 1858, and was valued at $50,000. Mining is now carried on in the quartz deposits. The auriferous reefs are worked with profit at a depth of 1,000 feet, and large smelting institutions are utilized to carry on the industry. The city is the seat of extensive commercial interests and is enjoying an era of prosperous growth. It has stone and asphalt pavements, electric street railways, waterworks, two colleges, a fine city hall, and a large public library. Among the manufactures are machinery, clothing, earthenware, flour, and leather goods. It was incorporated as a city in 1870. Population, 1922, 48,565.

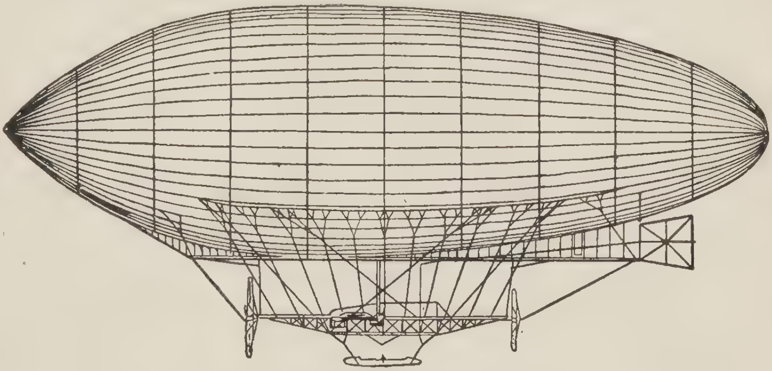
BALLAST (băl'last), a heavy substance used in weighting ships when the cargo is too light to sail safely with spread canvas. The amount of ballast depends upon the size of the ship, its construction, and the cargo carried. Ballast, as used in construction work, applies to gravel, rock, or any material with which highways and railroads are made solid and durable. All first-class railroads and highways in thickly populated countries are improved by a dressing and finishing of ballast.

BALLET (băl'lȧ), a dramatic representation consisting of dancing and pantomine with music. It originated in ancient times, possibly among the Greeks, who looked with favor upon dancers that expressed action and passions by rythm applied to gesture. In 1580 ballet dancing became popular in France, where it was encouraged by Catherine dé Médici. In modern times the ballet came to be used as an interlude in theatrical performances, intended to please the eye rather than impress mentally. Classical operas, such as "Faust" and "Tannhauser," employ the ballet much the same as it was used in former times.

BALLOON (băl-lo͞on'), a machine designed for the navigation of the air. The name was derived from a French word meaning ball, because the early balloons were round in shape. The construction of such a machine was first suggested by the flight of birds and the rising of soap bubbles into the air, which led to the construction of two classes of airships, one propelled upward by mechanical contrivances and the other by rarefied gases. Balloons propelled upward by means of gases were the first of several devices for aërial navigation with which it was possible to secure definite and satisfactory results. They depend upon the principle that a body lighter than air will rise with a force proportional to the difference between the weight of the air it displaces and its own weight. The gas employed is usually hydrogen, which is about fourteen times lighter than air, but coal gas is also used, which is about three times lighter than air. Balloonists who ascend into the atmosphere merely for exhibition purposes commonly confine heated air in the balloon bag, a portable quantity of which will carry them from 3,000 to 10,000 feet. During the time of inflating the balloon, it is fastened to the ground with ropes, and, when a sufficient amount of heated air has been confined within, it is loosened and ascends just as a cork rises in water.

The first deliberate scheme to navigate the air of which we have definite record was made in 1670 by Francis Lana, a Jesuit, who proposed to raise a vessel by metallic globes, containing vacuum inside, but it is asserted that the Chinese made successful ascents at Pekin as early as 1306. However, the scheme proposed by Lana was not practical, because metallic tubes that would raise a vessel could not be made strong enough to resist the pressure of the surrounding air, or, if made strong enough, they would be too heavy to rise. The type of balloon which has been most serviceable to make long flights was invented in 1782 by Stephen Montgolfier and his brother Joseph, paper-makers of Lyons, France. They gave a successful public exhibition June 5, 1783, with a balloon filled with air rarefied by means of a fire lighted in the car. Later M. Charles, professor of physics in Paris, succeeded in successfully substituting hydrogen gas for rarefied air, by means of which an ascent of 3,000 feet was made, the balloon passing over Paris and landing safely. The next year M. Blanchard made an ascent and carried with him a parachute to assist in making an escape in case of accident. He crossed the English Channel from Dover to Guiennes, and in 1802 M. Garnerin made the same exploit and landed safely in London by means of a parachute. Two years later M. Gay-Lussac made an ascent from Paris to a height of 23,000 feet, and demonstrated beyond a question that aërial navigation is practical.

The reader will observe that France takes undisputed precedence of all other countries in the early history of balloons. These machines have been so perfected that ascent and descent is entirely under the control of the guide, when the conditions of the atmosphere are favorable, but their movement through the air depends entirely upon the impetus of currents in the atmosphere. However, the type known as the *dirigible balloon,* which combines the common balloon with the flying machine, possesses the requisites necessary for the aëronaut to guide it successfully. This machine may be said to date from 1900, when Count Zeppelin, a German cavalry officer, traveled a distance of three and a half miles in his dirigible balloon. The larger sizes developed by 1926 are 700 feet long, carry twenty tons of freight or military explosives, and travel from 20 to 100 miles per hour.

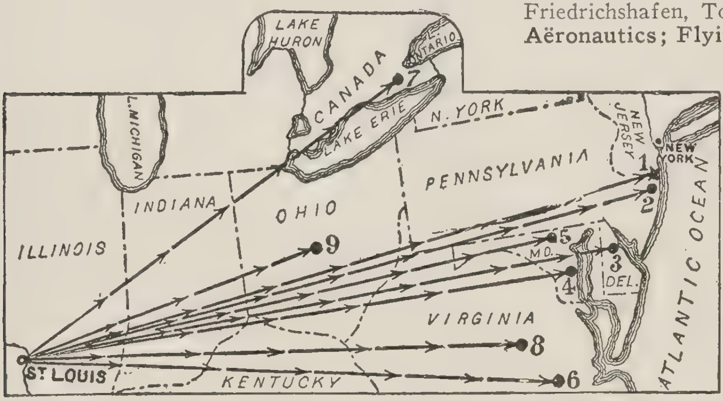


THE WELLMAN POLAR AIRSHIP.
(Length, 164 feet; greatest diameter, 52.5 feet; volume, 224,244 cubic feet.)

Balloons are made of long bands of silk sewed together, and rendered air tight by coats of varnish, put on at different times. They are filled with coal or hydrogen gas to render them enough lighter than air so there is a material difference between the weight of the bag and an equal body of air displaced by it. A safety valve is placed at the top, under the control of the aëronaut. Below the bag, suspended by means of a network of ropes, is a wicker-work boat or car in which the aëronaut sits. The boat or car is light, and in it are supplies necessary for the safety of persons making the trip upward; these consist, among others, of a long rope to aid in descending, and sand bags, which give weight, and in case of danger are thrown overboard to lighten the balloon, if necessary. A balloon about forty-eight feet long and thirty-five feet wide and thick will carry three persons, and with its appliances weighs about 300 pounds.

The highest ascent made by a gas balloon was that of the French balloon *Icare* in 1913, from France. It ascended to a height of over six miles, about 33,000 feet, and landed safely. Aside from ordinary dangers in aërial navigation, nature seems to have planned other barriers against it. The higher altitudes are extremely cold. In the ascent mentioned above Coxwell became insensible; his hands were frozen and he became numb from exposure while in a low temperature. Besides, the air in the higher altitudes is greatly rarefied, and at a height of about six miles is incapable of sustaining human life.

Many national and international associations are maintained to develop skill and interest in ballooning. The International Balloon Congress, one of the most noted organizations of this class, has held several important meetings at Brussels and in other cities of Europe. In 1907 the second competition for the Gordon Bennett Cup was held at Saint Louis. The contestants included one British, two French, three American, and three German balloons. The cup and a cash prize were won by the German balloon *Pommern,* which flew to Asbury Park, N. J., and covered a distance of 901 miles in 39 hours and 55 minutes. The balloons in this contest were not dirigible. The largest exploring balloon on record is the one built in 1908 for Walter Wellman, who planned to use it in an attempt to reach the North Pole. It was constructed partly of bamboo, with a frame of steel, and was fitted with two screw propellers and three gasoline motors. Although the balloon worked successfully, the trip to the North Pole was undertaken the next year and proved unsuccessful.



RACE FOR THE GORDON BENNETT CUP IN 1907.

1, The Pommern; 2, L'Isle de France; 3, the Düsseldorf; 4, the Saint Louis; 5, the America; 6, the Abereron; 7, the United States; 8, the Anjon; 9, the Letus II.

In military service balloons have become highly efficient. During the siege of Paris by the German army, the celebrated French deputy, Gambetta, on Oct. 7, 1870, escaped from the city in a balloon, and utilized his freedom in organizing a large army in the provinces with the intention of compelling the Germans to raise the siege. It is estimated that during this siege fully 2,500,000 letters were sent from the city to people outside by means of balloons. Some of these were captured, others landed safely, and one was found as far northeast as Central Norway. Large numbers contained carrier pigeons, that were utilized by friends to send answers back to those in the city. In the World War, in 1914-1918, balloons were superseded by the airplane.

The large dirigible flying machine, the *ZR-3,* completed in 1924 at the Zeppelin works in Germany, under the treaty provisions for the United States, flew across the Atlantic and was delivered by Dr. Hugo Eckener in perfect condition after a flight of 81 hours. Later it was renamed the *Los Angeles.* In 1929 the *Graf Zeppelin,* under Dr. Eckener, made a successful trip to Lakehurst, N. J., and back to Germany. In August, 1929, it made a second trip to Lakehurst to begin its flight around the earth, carrying 20 passengers and a crew of 40. The trip was made via Friedrichshafen, Tokio, and Los Angeles. See **Aëronautics; Flying Machines.**

BALLOON FISH, a kind of fish native to the tropical seas. They are peculiar for their power to inflate themselves with air, which they do to evade pursuit, and when in that condition float on the surface of the water with their back down. The flesh is not eaten.

BALLOT (băl'lŭt), a term derived from the French, signifying a little ball used in voting. In ancient Greece balls made of stone or metal were used to express verdicts. This custom still maintains in some countries for limited purposes, and generally in civic societies on the admission of applicants to membership. In Greece the practice was called the *die-cast,* while it is now generally termed *balloting.* In civic societies a given number of black balls thrown in will defeat the candidate, who is then said to be *blackballed.* Various forms of ballots of paper, wood, and stone have been used for centuries. The common ballot now used in governmental affairs is of paper, and its honesty and secrecy is protected by the law. See **Australian Ballot.**

BALL'S BLUFF (bạlz blŭf), a steep bank on the Potomac River, in Loudoun County, Virginia. It was the scene of a battle between the Union forces and the Confederates on Oct. 21, 1861, when a small Federal army was surrounded and defeated. The latter lost heavily, and their leader, Colonel E. D. Baker, was slain.

BALM (bäm), a plant of the mint family,

ARRIVAL OF THE GRAF ZEPPELIN IN LOS ANGELES

The *Graf Zeppelin* is a dirigible flying machine. It was built at the Zeppelin works on Lake Constance, Germany, and has the reputation of being one of the largest airships built up to 1930. It is 776 feet long and 98 feet in diameter, and has a cruising radius of 6,000 miles at 60 to 75 miles an hour. In construction it resembles the *ZR-3* (now the *Los Angeles*). As fuel for the motors it uses chiefly what is known as *blau gas*, so named from Dr. Blau of Germany, which is a fuel gas almost as light as air and contains a negligible percentage of high-inflammable gas. However, the engines also can use gasoline.

The *Graf Zeppelin* has five air-cooled Maybach motors of 530 horsepower. These and the passenger and navigation cabins are hung below the body of the airship, whose skeleton is streamlined, supported by frames made of duralumin. Every convenience of modern life is provided, such as electric telephones, electric kitchen, lounging and library rooms, and radio equipment. This modern vehicle of travel, built at a cost of about $1,000,000, with its crew of 40 and about 20 passengers, has been acclaimed the pride of the air and the beginner of a new era in commercial transportation.

Besides making successful trips in 1928 and 1929, from Friedrichshafen to Parkhurst, N. J., and return, the *Graf Zeppelin* made a notable tour of the countries bordering on the Mediterranean. In 1929 it accomplished the first successful commercial round trip of the world. The accompanying illustration shows this giant airship on its arrival at Los Angeles on Aug. 26, 1929, after crossing the Pacific safely from Japan.

noted for its fragrance. It is perennial, has ovate and crenate leaves, and is used in medicine as a stimulant and aromatic. The oil of balm, derived from this plant, is an essential oil. Several species are found in Eurasia, especially along the Mediterranean, and some varieties have been naturalized in England and America. The catmint, or catnip, resembles the balm but does not belong to the same class. The Moldavia balm is used for flavoring in Germany and the bastard balm is cultivated in England for its fragrance, which the leaves retain a long time after being dried.

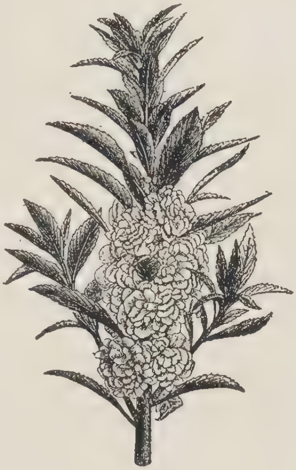
BALMACEDA (bäl-mȧ-sā'thȧ), **José Manuel,** soldier and statesman, born in Santiago, Chili, in 1840; committed suicide Sept. 19, 1891. Though educated for the church, he soon engaged in politics, and became a progressive leader of the Liberal party in Chili. He was President for five years, beginning in 1886. At the end of his term he refused to surrender the presidency, and became involved in war, but was defeated. He attempted to flee with a million dollars, but missed his passage on a British ship, which caused him to commit suicide.

BALM OF GILEAD (gĭl'ē-ŭd), the resinous substance derived from a tree native to Arabia Felix. It is referred to in the Old Testament and is still sold extensively in Arabia and other Asiatic countries, where it is obtained by making incisions in a small tree. At first it is white, but afterward turns to a golden yellow color and resembles honey in consistency. By boiling the fruit and the wood an inferior quality is obtained. It is irritating to the skin and has a bitter taste. The odor is highly fragrant.

BALMORAL CASTLE (băl-mŏr'al), the autumnal residence of the royal family of England, situated 45 miles west of Aberdeen, Scotland. It occupies an elevated site 920 feet above the sea, a natural platform that slopes gently to the Dee River, and is surrounded by beautiful mountain scenery. The estate contains about 40,000 acres, purchased in 1852 by Prince Albert, and on it is the magnificent castle built at his own expense at a cost of $500,000. It is constructed of granite in the Scotch baronial style of architecture. Edward VII. made a number of important changes in its furnishings and decorations.

BALSAM (bạl'sam), an aromatic, resinous substance secured from plants containing volatile oil and resin. Many substances sold in the market are known as balsam, but the balsams of Peru and Tulu are most generally used in medicine. The former is obtained from a tree native to tropical America and the latter from the forests of Tulu, on the Magdalena River. The balsam of copaiba is a yellowish liquid with a bitter taste, with a more or less viscid consistency, and is the product of trees found in South America and the West Indies. Another product of this class, the balm of Gilead (q. v.), is imported from Arabia. These products are generally used in the arts, for medicine, and in making perfumery.

BALSAM, a flowering plant of India, but naturalized in all the continents. It has been cultivated for more than three centuries for its beautiful flowers, some of which are double and are known as *camellia.* The plant grows from one to two feet in height and branches freely. Many varieties of colored flowers have been secured by propagation.



FLOWERING BALSAM.

BALTIC (bạl'tĭk), **Battle of the,** a naval contest on the Baltic Sea, April 2, 1801, between the English under Sir Hyde Parker and Lord Nelson and the Danish fleet, in which the latter was defeated.

BALTIC PROVINCES, formerly a section of Russia, bordering on the Baltic Sea, including the three governments of Courland, Esthonia, and Livonia. The area is 64,844 square miles. In 1919 the region was formed into the three republics of Lithuania, Latvia and Esthonia. Letts and Esths make up the bulk of the people, and the burghers include many Germans. Formerly Courland was a dependency of Poland and Esthonia and Livonia belonged to Sweden. Peter the Great annexed Courland in 1795 and the remainder was previously acquired by conquest from Sweden. The people are largely Protestant and were not in strict harmony with the policy of the former Russian government, which sought to dictate in the use of the Russian language in the schools and the adoption of the Greek faith. These provinces revolted and declared a republic at the time of the Russo-Japanese War, in 1904, but the movement was suppressed by military force. The Germans under General von Hindenburg invaded this region in 1915. Riga is the chief city and now the capital of Latvia. Population, 1928, 6,189,805.

BALTIC SEA, the inland sea that washes the shores of Denmark, Sweden, Russia, and Germany, and communicates with the North Sea by the Cattegat, the Sound, and the Great and Little Belt. The length is about 800 miles; breadth, 100 to 200 miles; depth, forty to 140 fathoms; and area, including the Gulfs of Bothnia and Finland, 184,497 square miles. The islands within the sea have an erea of about 12,000 square miles. In the northern part is the

Gulf of Bothnia, which is separated from the southern portion by a chain of islands, and in the eastern part are the Gulfs of Finland and Riga. It receives the inflow from 250 rivers, which renders its waters almost fresh, and increases its tendency to freezing in the winter season, thus impeding navigation from three to five months of the year. The largest rivers that flow into it are the Niemen, Duna, Oder, Neva, Vistula, Narva, and Trave. It has a large trade, both with ports in Europe and in other continents. The leading harbors are at Stockholm, Memel, Danzig, Riga, Cronstadt, Kiel, Stettin, Copenhagen, and Helsingfors. It is connected with the North Sea by the Kaiser Wilhelm Canal (q. v.) and other canals furnish communication with divers trade centers. Navigation is dangerous on account of breakers at numerous islands, sudden changes of wind, and violent storms. Valuable amber is cast ashore by waves in Prussia and Courland. There are extensive salmon, trout, and herring fisheries. The southern coast of Sweden is gradually sinking and the upper coast rising, the rate of change being estimated at about three feet in a century. The name Baltic was derived, from the island Baltia, but it is called East Sea by the Germans.

BALTIMORE (băl′tĭ-mōr), the largest city of Maryland, an important commercial center, on the Patapsco River, fourteen miles above Chesapeake Bay. It is at the head of tide water navigation, 40 miles northeast of Washington, D. C., and is the focus of important steam railway and electric interurban lines. Among the railroads are the Pennsylvania, the Baltimore and Ohio, the Maryland and Pennsylvania, and the Western Maryland railways. Rapid and extensive intercommunication is afforded by a vast system of electric lines.

The principal streets running east and west are Lexington and Baltimore, and Charles is the main thoroughfare running north and south. A small stream called Jones's Fall divides the city into two nearly equal parts. Near the Patapsco River, from which the ground rises gradually toward the north, are the largest wholesale and manufacturing establishments, and much of the shipping is done from docks on a branch of the river which extends well into the heart of the city. At the northern limit of the harbor is Pratt Street, from which the wholesale district extends toward the north, and is bounded by Paca, Light, and Baltimore streets. The retail shopping district is toward the west, and the fashionable residential quarter is toward the north. In numbering the houses the decimal plan is used, the numbers extending east and west from Charles Street and north and south from Baltimore Street.

Points of Interest. Druid Hill Park is one of the finest public grounds in America and contains Druid Lake. This park is ornamented with fine walks, statuary, and beautiful avenues of trees. It is situated in the northwestern part of the city and contains 671 acres. Clifton Park is in the northeastern part, and near the river, in the eastern part of the city, is Patterson Park. Carroll Park, Wyman Park, and several others add beauty to the city.

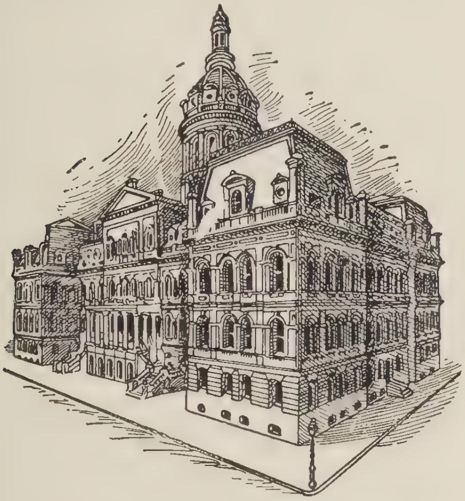
Baltimore is called the Monumental City because of its fine Washington Monument, erected about 1820, and located at Mt. Vernon Place and Monument street. It is 164 feet high and the marble shaft is surmounted by a colossal statue of Washington. Battle Monument, in Monument Square, was erected in 1815 to commemorate those who fell in 1812, while defending the city against the British. In Mount Vernon Place are statues of Chief Justice Taney and George Peabody.

A monument to the memory of Columbus, a statue of Sir William Wallace, and the Ridgely and Wildey monuments are among a number of others that merit special mention. Greenmount Cemetery contains the graves of Johns Hopkins, John McDonogh, and other illustrious men, and is noted for its beautiful trees and fine statuary. The National Cemetery contains the graves of many Union soldiers and Westminster is the burial place of Edgar Allen Poe.

Institutions. The city is noted as an educational center and as the seat of many benevolent and scientific societies. Its system of public schools has courses ranging from the primary to the collegiate branches, and instruction in kindergarten work and manual training has been provided for amply. George Peabody endowed the Peabody Institute, which has a library of 140,000 volumes and a conservatory of music. Johns Hopkins Hospital is a charitable institution. The Saint Paul's Orphan Asylum, the Saint Joseph's Hospital, the Hebrew Orphan Asylum, the Maryland University Hospital, the Baltimore Orphan Asylum, and the State Asylum for the Insane are among the leading charitable institutions. The professional schools include the Maryland College of Pharmacy, the medical and law departments of the University of Maryland, the Goucher College, the Baltimore College of Dental Surgery, and a number of others. Baltimore is the seat of the famous Johns Hopkins University, one of the most noted institutions of higher learning in America, which is attended by a large number of students and has a library of about 255,000 volumes. The Enoch Pratt free library has about the same number of volumes and many pamphlets and manuscripts.

Buildings. Solidity and convenience are combined in the architecture of Baltimore, which has been greatly improved since the disastrous fire in 1904. Its business buildings are notably well constructed, both from the standpoint of durability and appearance. The post office, the city hall, the city jail, and the United States courthouse are among the chief structures erected by the city and the Federal government. The larger commercial buildings include the Gas and Electric Company Building, the Standard Oil Building, the Citizens National Bank, and the Baltimore and Ohio Building. Near the intersection of Saratoga and Charles streets is the Masonic Temple. Johns Hopkins Hospital, the Enoch Pratt free library, and the Peabody Institute have substantial quarters. Among the noted churches are the Roman Catholic Cathedral, the Grace Episcopal Church, the Mount Vernon Methodist Church, the First Presbyterian Church, the Eutaw Place Synagogue, and the Unitarian Church. Baltimore is the seat of a Roman Catholic archbishop and a Protestant Episcopal bishop.

INDUSTRIES. Ample railroad facilities and a favorable location for transportation by water have made Baltimore a great center of manufacturing and commercial enterprises. The harbor is amply deep for the largest seagoing vessels, and regular communication is afforded by the principal lines with Bremen, London, and other foreign ports. As an export city it takes high rank and ships more corn to foreign countries than any other port of America. Flour, tobacco, coal, and cotton are among the chief export articles, while large quantities of iron ore, sugar, fruit, and general merchandise are imported. In manufacturing there is scarcely an industry that is unrepresented. Oyster packing and fruit canning are represented by large investments. Machinery, boots, and shoes, textiles, clothing, and fertilizers are among the products that are manufactured on the largest scale. Shipbuilding is developing steadily as an industry, and the extensive fisheries of Chesapeake Bay have made Baltimore a shipping center of fresh and canned oysters.

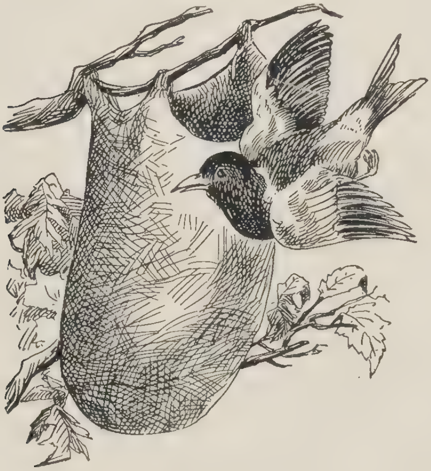

CITY HALL, BALTIMORE.

HISTORY. Baltimore was founded in 1729 and named in honor of Lord Baltimore (q. v.), proprietor of the colony of Maryland. In 1796 it was incorporated as a city. The harbor was greatly improved in 1780, when it became a port of entry, and since then its commerce has progressed steadily. In the War of 1812 it was held in a state of blockade, but a gallant defense at Fort McHenry and other fortifications prevented its capture. It was at the time of the bombardment of Fort McHenry, in 1814, that Francis Scott Key, inspired by the bravery of the Americans, although detained on board a British vessel, wrote the well-known song "The Star Spangled Banner." The first electric telegraph line in the United States was built from Baltimore to Washington in 1844. The city was occupied by the Federals at the time of the Civil War, when its industrial life became prostrated, but since then it has grown steadily in every material enterprise. A destructive fire in 1904 consumed buildings and property valued at about $80,000,000, but the district visited by the conflagration was rebuilt on a substantial scale within two years. In population the city takes rank as the eighth in the United States, being exceeded in this respect by Cleveland, Boston, Saint Louis, Detroit, Philadelphia, Chicago, and New York. Population, 1920, 733,826.

BALTIMORE, George Calvert, Lord, born in Yorkshire, England, in 1580; died April 15, 1632. He graduated from Oxford University and spent some time in foreign travel. Later he was made secretary of state under King James I., which position he resigned in 1624. In 1625 he was raised to the Irish peerage with the title of Lord Baltimore and received a grant of land in New Foundland, which he abandoned on account of French aggression, and in lieu thereof was granted a patent to Maryland. The grant included the entire State, which was made a colony in 1633 with Leonard Calvert, brother of Lord Baltimore, governor. Lord Baltimore died soon after and the grant was turned over to his son Cecil, who is regarded the real founder of Maryland, although he did not visit the colony. Under Calvert the colony was prosperous.

BALTIMORE ORIOLE (ō'rĭ-ōl), a common bird in America, allied to the starlings. It is more properly called *Baltimore bird,* since there are only suborioles in America. It is about seven inches long and has pointed wings, a sharp bill, and a rounded head. The plumage is beautiful; the head and upper parts are black mixed with bright orange and yellow. It was named from Lord Baltimore's livery, or coat of arms, as its colors agreed with that of the bird. The nest is built pouchlike of grass and twigs interlaced like threads and is suspended from the branches. It feeds on beetles, caterpillars, and insects. The Baltimore oriole is noted for bravery in defending its young and for its pleasant and clear song. See illustration on following page.

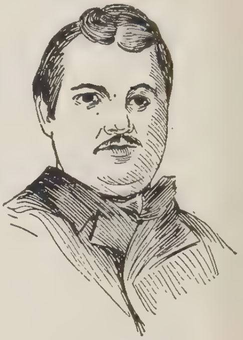
BALUCHISTAN (bä-lōō-chĭs-tän′), or **Beluchistan,** a country in Asia, bounded on the north by Afghanistan, east by India, south by the Arabian Sea, and west by Persia. The area is 131,855 square miles. It has a mountainous surface and contains some sandy deserts, with intervals of productive and fertile regions. The highlands belong to the plateau of Iran, which extends into Baluchistan from Persia. It has a coast line of 600 miles on the Arabian Sea, which affords few harbors. A large part of the country is arid and requires irrigation to make agriculture profitable, but the rivers are few and too short to supply much water for that purpose. The principal products are cotton, indigo, tobacco, cattle, hides, wool, and tropical fruits. Minerals are found in the mountain districts, the most important of which are copper, lead, saltpeter, coal, and petroleum. Large numbers of animals, especially camels, graze upon its plains. The country has several railroads, but depends largely upon the camel for transportation. The inhabitants consist chiefly of Baluchis, a native race of Aryan people, who speak an Iranic dialect and adhere to the Islam faith, professing the Sunnite creed. Since 1877 the country has been under the government of Great Britain for military and strategical purposes, but it is administered nominally by the Khan of Kelat. Quetta, in the northeastern part, is the largest city, and Kelat is the capital. Population, 1921, 914,551.



BALTIMORE ORIOLE.

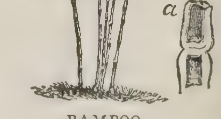
BALUSTER (băl′ŭs-tẽr), or **Banister,** in architecture, the name of small shafts or pillars used to support a cornice or coping. Balusters are employed in stairways as guards, in bridges as parapets, and for a number of other uses. The material used in construction may be wood, cement, metal, or stone, and in form they differ largely, being usually ornamented in workmanship and beautified by polish and paint.

BALZAC (bál-zák′), **Honore de,** celebrated novelist, born in Tours, France, May 16, 1799; died in Paris, Aug. 20, 1850. His father, a man of middle rank in society, gave him the advantages of an early education in his native town and Paris, and he afterward took up the study of law. For a short time he was a clerk in a notary's office, but soon gave up law for literature, and published several novels under various *nom de plumes* before 1823. His success was limited until 1830, when he published "The Last Chouan," a novel of much merit. "The Human Comedy," a work picturing modern life, is his best production. He used this name as a means of contrast with the "Divina Commedia" of Dante. In 1833 he first met Madame Hanska, a countess of Poland, who seems to have influenced him and his writings to a large extent. After 1843 he visited her frequently and finally married her a few months before his death. As a prolific writer and student of human character, Balzac ranks with Saint-Simon and Shakespeare. His collected writings include eighty-five novels, which were published in a work of forty-five volumes. The best known of his works embrace "Eugénie Grandet," "Scenes of Provincial Life," "Poor Relations," "Cousine Bette," "Father Goriot," and "Scenes of Parisian Life."



HONORE DE BALZAC.

BAMBERG (băm′bẽrg), a city of Germany, in Bavaria, near the confluence of the Main and Regnitz rivers. The chief buildings include a cathedral in the Byzantine style, the palace of the former prince bishops of Bamberg, the city hall, and many educational and charitable institutions. It has manufactures of cotton and silk textiles, gloves, musical instruments, and machinery. The municipal improvements consist of waterworks, electric street railways, and pavements of stone, macadam, and asphalt. Bamberg dates as a city from 973. Population, 1920, 47,810.



BAMBOO.

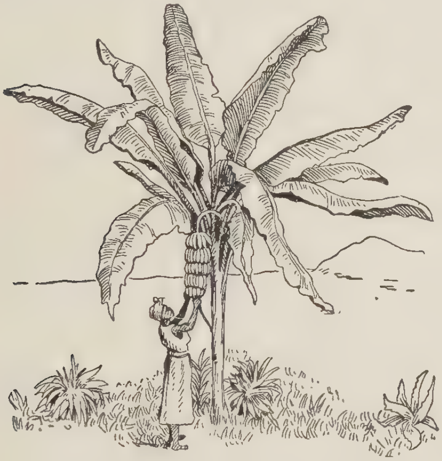
a, section of the stem at node.

BAMBOO (băm-bōō′), a giant grass or reed native to tropical America, Africa, and Asia. Many species have been described, ranging from the smaller forms to those which attain a height of 80 to 100 feet. They have a rootstock which is jointed under the ground and

(Opp. 222) A BAMBOO GROVE IN THE PHILIPPINE ISLANDS.

throws out numerous stems, and in the larger species the main stem or trunk is often twelve inches thick. Although the stems are jointed and very hard, they are both light and elastic. These plants are widely distributed, ranging from the marshes and swamps near the level of the sea to altitudes of 12,000 feet, and they grow both in wet and dry soil. They can be propagated from the young shoots or from the seeds, which resemble rice. The seeds and young shoots are eaten, while the stalks are used for building purposes, fences, water pipes, masts for boats, walking sticks, ladders, in the manufacture of paper, and for many other purposes. Some of the finest cottages in Southern Asia are constructed wholly of bamboo. In America we frequently see it in fans, fish poles, and walking sticks.

BANANA (bȧ-nä′nȧ), a plant of the plantain family, which somewhat resembles the palm tree. It was first found in the East Indies, but has been brought to and is successfully cultivated in all tropical and semitropical climates. The trunk is not like that of a tree, since it consists of the closely compacted sheaths of the fallen leaves. It often grows to a height of twenty-five feet, but dies down each year, and is replaced the next season by new sprouts, of which two or three are allowed to bear. The leaves are ten feet long and three feet wide, and are of a beautiful emerald green. The fruit is from four to twelve inches long, and grows in bunches often weighing seventy-five pounds. It is one of the most important foods known and is used extensively, being transported in large quantities to the northern markets. The bunches are picked green and ripen in transportation or in stores. Land will produce about twenty-five times more food if planted in bananas than if sown to wheat. Besides being valuable as a food plant, the fibers of its stalks are used in weaving cloth, an indelible ink is made from the juices of the skin, and the leaves are employed to cover the roofs of houses.

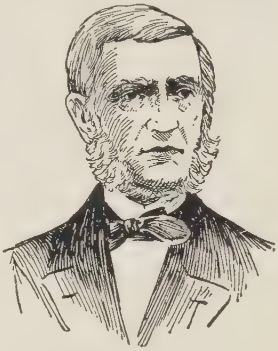


BANANA.

BANANA, a seaport city of the Congo Free State, on a small peninsula of the same name, at the mouth of the Congo River. It is not important as a commercial center, having been displaced by Matadi, a town on the mainland, from which a railroad line extends to Leopoldville. The inhabitants are chiefly natives and not more than 125 white people reside in Banana.

BANCA (băn′kȧ), or **Banka,** an island in the East Indies, separated from Sumatra by the Banca Strait. It has an area of 4,446 square miles. The climate is moist and the surface is level. Tin is the most important product and is mined by the government. The annual exportation is about 4,500 tons. Fruit is grown extensively and salt and rice are the chief imports. The island is a colonial possession of the Netherlands. Population, 1922, 106,242.

BANCROFT (băn′krŏft), **George,** historian, born at Worcester, Mass., Oct. 3, 1800; died in Washington, D. C., Jan. 17, 1891. In 1817 he graduated at Harvard College and later took a two years' course at Göttingen, Germany, where the degree of Ph. D. was conferred upon him in 1820. While in Europe he formed the acquaintance of many eminent scholars, among them Schleiermacher, Humboldt, Goethe, and Savigny, and attended the lectures of Hegel at Berlin. On returning to America in 1832, he became tutor in Greek at Harvard College, and in the meantime lectured and gave attention to historical research. He was appointed Secretary of the Navy by President Polk in 1845, in which year he founded the United States Naval Academy, but resigned the next year, when he became minister plenipotentiary to England. In 1849 he returned home to take up his literary work in Washington. He was made minister to Germany in 1867, when he negotiated the treaty whereby the German emigrants to the United States were released from allegiance to the government of their native country, and at his own request was recalled in 1874. His lectures on German literature and historical topics are classed with the finest American productions. Among his principal works are "History of the Colonization of the United States," "History of the United States," and "History of the Revolution in North America." He contributed largely to the *North*



GEORGE BANCROFT.

American Review. His last public address was given at Washington, D. C., at a meeting of the American Historical Association, in 1886.

BANCROFT, Hubert Howe, historian, born in Granville, Ohio, May 5, 1832; died March 2, 1918. He clerked in a bookstore in Buffalo, N. Y., and in 1852 removed to California. He collected about 45,000 volumes of books to obtain data for historical works on the history of the Pacific states. In this undertaking he was aided by a large staff of literary assistants. He published five volumes on "The Native Races of the Pacific States," and forty volumes on "History of the Pacific States of North America."

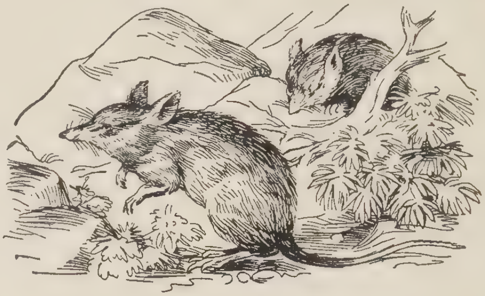
BANCROFT, Marie Effie Wilton, actress, born in Doncaster, England, in 1819; died May 22, 1921. She appeared as *Fleance* in "Macbeth" in 1846, and soon after played successfully in London. In several boy characters she won much applause. In 1865 she became one of the managers of the Prince of Wales Theater, which soon grew popular for its interesting comedies. She retired from the stage in 1885. Sir Squire Bancroft, her husband, was knighted in 1897. She published "Mr. and Mrs. Bancroft On and Off the Stage," "My Daughter," and "A Riverside Story."

BANDAGE (bănd'āj), a band or wrapper used by surgeons to retain dressing or bind the injured parts of wounds. Strips of muslin are used to make the common form of bandages, and in some cases, linen, flannel, or cheese cloth serves the same purpose. Bandages are applied to the fingers or limbs spirally, each turn lapping partly over the last, but many forms are needed to fit special cases of different kinds. In applying the bandages much care must be exercised lest the pressure obstructs the circulation, causing gangrene or blood poison.

BANDA ISLES (bȧn'dȧ), a group of islands in the East Indies, about fifty miles south of Ceram, a colonial possession of the Netherlands. The group includes about ten small islands of volcanic origin, of which Banda Neira and Banda Lontar are the largest. Gulong Api, the highest peak, has an elevation of 2,250 feet above the sea. Banda, the capital, has a good harbor. Nutmeg and fruits are the chief products. The total area is about seventeen square miles. Population, 8,000.

BANDICOOT (băn'dĭ-kōōt), a species of rat native to Ceylon and India. It is the largest representative of the rat family, measuring about one foot in length. The tail is long and very thick at the base, and the color is black above and gray beneath. It subsists on rice and other cereals and is fond of vegetables. The flesh is eaten by the natives. The bandicoot of Australia and Tasmania is a marsupial. It resembles a rabbit and is a pest in the wheat fields and gardens.

BANDIT (băn'dĭt), a person who has become outlawed, wages war against civilized society, and resorts to robbery. Banditti are common in Albania, owing to the incompetence of the Turkish government to suppress large bands who have become outlawed. These bands frequently take travelers captive and hold them for a ransom.


BANDICOOT.

BANEBERRY (bān'bĕr-rȳ), a common plant of America and Europe. It is a species of crowfoot and has a terminal cluster of flowers, and the fruit is a red or white berry, which is poisonous. Several species are common to the woods of North America.

BANFF (bȧmf), a town of Canada, in Southwestern Alberta, on the Bow River. It is located on the transcontinental line of the Canadian Pacific Railroad, and is surrounded by fine mountain scenery. In the vicinity are hot sulphur springs. The springs have made the region famous and are visited both for health and pleasure. Fine hotels, a sanitarium, and a number of other buildings are noteworthy. Population, 1921, 1,852.

Banff is the headquarters of the Rocky Mountain National Park, and is one of the most widely-known resorts of North America. A golf course, tennis courts, riding tours, and swimming pools furnish pleasant pastimes for thousands of tourists. During the summer the population approximates 6,000.

BANGALORE (băn-gạ-lōr'), a city of India, in the state of Mysore, 175 miles west of Madras. Silk textiles, carpets, clothing, earthenware, and machinery are the chief manufactures. Bangalore dates from 1537. It was stormed and captured by the British under Lord Cornwallis in 1791. Population, 1921, 189,046.

BANGKOK (băn-kŏk'), the capital of Siam, located on the Menam River, about twenty miles from the sea. The river is navigable to the city for vessels, but their passage at its mouth is somewhat impeded by silt deposits, which render it only six feet deep at ebb tides, but at flood tides the water is fully fourteen feet. The city is the seat of vast commercial interests and carries on extensive manufactures. It is connected with other cities of Southern Asia by telegraph and railway lines, and is one of the largest cities of Southern Asia. Its population is mixed largely with all classes common to Asia, but the

Chinese constitute fully one-half of the inhabitants and control the largest part of the trade. Most of the city is built over the water of the river. Many of the houses are constructed of bamboo and are connected by bridges, thus presenting a peculiar contrast to the architecture of Europe. On account of the site of the city being flat, many buildings located on the land are on piers about six feet above the ground. The palace of the king is surrounded by a high wall and with it are inclosed a number of temples, public offices, and a theater. Within the walls are the royal harem and the residences of many servants and attendants. Transportation within the city is by a line of omnibuses and a system of electric railways. The municipality has waterworks and electric lighting. Its modern prosperity dates from 1766, when it became the capital. Population, 1921, 685,380.

BANGOR, the county seat of Penobscot County, Maine, on the Penobscot River, and on the Maine Central and other railroads. On the opposite side of the river is the town of Brewer, with which it is connected by a bridge. The river is navigable for the largest vessels. Among the chief buildings are the county courthouse, the public library, the custom house, and the Bangor Theological Seminary. The manufactures include boots and shoes, clothing, flour, trunks and valises, and ships. It has a large trade in ice and is one of the leading lumber depots in the world. Gas and electric lights, pavements, waterworks, sewerage, and electric street railways are among the improvements. The vicinity was first settled in 1769, when it became known as Kenduskeag Plantation, and it was incorporated as Bangor in 1791. Population, 1920, 25,978.

BANGS (băngz), **John Kendrick,** author, born at Yonkers, N. Y., May 27, 1862; died Jan. 21, 1922. He graduated at Columbia College in 1883 and subsequently studied law. In 1884 he took up editorial work, contributing to *Harper's Magazine,* of which he became editor in 1899. Many of his writings are humorous and some have been dramatized. His chief books are the "The Water Ghost," "Tiddledywinks Tales," "Coffee and Repartee," "Three Weeks in Politics," "A Rebellious Heroine," "Mr. Bonaparte of Corsica," "Uncle Sam, Trustee," "A Houseboat on the Styx," "Mollie and the Unwise Man," "The Enchanted Typewriter," "Over the Plum Pudding," "Ghosts I Have Met," "The Mantelpiece Minstrels," and "Peeps at People."

BANGWEOLO (băng-wē-ō'lȧ), or **Bemba,** a large lake in Africa, in the northern part of Rhodesia. The length from north to south is 150 miles and the width is about 75 miles. It has an elevation of 4,000 feet above the sea. The Chambezi flows into it from the east, and it discharges a part of the year by the Luapula. Several small islands within the lake are inhabited by natives. The lake was discovered by Livingstone in 1868 and was visited by Stanley in 1876.

BANIM (bā'nĭm), **John,** novelist, born at Kilkenny, Ireland, April 3, 1798; died Aug. 13, 1842. He took up a literary career at an early age, and became noted on account of his ability to delineate the life and character of the Irish peasantry. Though proficient as a writer, he was deficient in humor, but his writings are numerous and have had a large sale. His chief books include "The Battle of the Boyne," "The Smuggler," "The Mayor of Windgap," and a drama entitled "Damon and Pythias."

BANJO (băn'jō), a musical instrument with three strings, having a head similar to a tambourine and resembling a guitar. It is played by striking or twitching the strings with the fingers of the right hand. Joel Walker Sweeney, an American musician, is the inventor, who learned to play on the rude instruments used on the southern plantations and patterned largely from them. He was born in 1813, and died at Appomattox, Va., in 1860. His reputation as a banjo player extended to Europe, where he performed many times before Queen Victoria.

BANKING (băn̲k'ĭng), the occupation or business that relates to the care, custody, and handling of money. Banks are of very great antiquity. Babylonian tablets bearing distinct records of transactions in banking in the time of Nebuchadnezzar are in the Metropolitan Museum of Art in New York City. Modern banking had its origin with the money dealers of Florence, who attained high repute as receivers and lenders of money in the 14th century. The name *bank* is from the Italian *banco,* a bench, from the practice of the Jews in Lombardy, who had benches in the market places while in the business of exchanging money. The bench of the banker was broken by the populace when the banker failed, and from this we have the word *bankrupt.* Goldsmiths undertook the business of borrowing and lending money at an early date, largely because people desired to pawn their jewelry with them as security, although banking has no direct connection with their art. With the diversification of industries, which is one of the characteristics of higher society, banking became an independent institution.

European. Among the early banks of Europe are the Bank of Barcelona, founded in 1401; the Bank at Genoa, for centuries one of the most stable banks of Europe, organized in 1407; and the Bank of Amsterdam, founded in 1609, a great storehouse for bullion in the 17th century. The last-mentioned bank issued receipts for the bullion and coin deposited, and these circulated as money. The Bank of Venice was the first national bank founded in Europe. The Bank of England was established in 1694, as the fourth important national bank, and is acknowledged to be one of the strongest financial institutions in the world. It was organized as a joint-stock association with a capital of £1,200,000. In return for loaning its entire capital to the government, it received a monopoly of the corporate banking in England and the right to issue notes for circulation as currency. In 1908 it had eleven branches, a capital and reserve of £18,125,000, a circulation of £30,250,000, and deposits of £48,750,000. The Bank of France was founded in 1800 and ranks next in repute to the Bank of England. It has a capital and reserve of 90,000,000 francs and the sole right to issue paper currency in France. The Imperial Bank of Germany, established in 1875, has a capital of $28,575,000, but it is not the only bank of issue in the German Empire, this function being vested in a total of eight banks, whose authorized issue is $91,630,000. Besides, the government itself issues a large amount of currency in the form of small notes for the convenience of the public. The National Bank of Belgium is modeled after the Bank of France.

American. The Bank of North America was established in 1782 at Philadelphia, and was the first *bank of issue* founded in America. However, the first bank of issue in the United States was organized in 1791, under a plan proposed by Alexander Hamilton, with a capital of $10,000,000. This bank was discontinued as a bank of issue in 1811, and five years later Congress granted a twenty years' charter to a new United States bank, with a capital of $35,000,000, but on the expiration of that term refused to grant a renewal. About that time State banks were established and continued to do business a number of years, but they proved unsatisfactory and unstable. Under this plan the several states had different systems of banking, which caused inconvenience in exchanging money when passing from one State to another. This tended to increase the rate of interest, rendered currency subject to excessive discount, and caused numerous panics. However, they continued to do business until 1866, when a tax of ten per cent. was imposed upon their notes, which caused them to surrender their charters.

At the recommendation of Secretary Chase, a national banking system was established in 1863, under which the paper currency became uniform in all the states. The plan provides that a portion of the banking capital must be invested in government bonds. These bonds are deposited with the treasurer at Washington, upon which paper currency to the full amount of the face value is issued to the bank making the deposit, and this currency is put into circulation. The plan is so formulated that the bonded indebtedness of the country becomes the basis of this class of banking. These bonds deposited with the United States are security, whereby the currency is guaranteed and its value is maintained at parity with gold.

Classes of Banks. Several classes of banks are maintained in most countries, depending upon the charter under which they operate, or the nature of the business which they transact. While all banks receive deposits, only a comparatively few are banks of issue or circulation; that is, they do not issue paper currency for general circulation. A small rate of interest is paid on *time* deposits, but, when the deposits are made *subject to check* by the depositor, usually no interest is paid. All banks loan money from their own funds and from the deposits. The loans are largely for short periods, but sometimes for a year or more, when mortgages or deeds of trust are taken as security for the loans. Banks effect exchanges between their depositors and others, a department of banking which has grown into importance. The individual who wishes to send money to some other city usually buys a draft and transmits that instead of the currency, and it is received in other money centers as equivalent to the cash. It is estimated that not more than from twelve to fifteen per cent. of the entire business transacted through banks in Canada and the United States is effected by the payment of currency.

Clearing houses are associations of banking houses to aid in the settlement of balances between given banks. In this way much time is saved in making exchanges, and it is not necessary to make an actual count of the money. Savings banks are institutions in which small sums of money are deposited from time to time, as they accumulate in the hands of persons limited to moderate earnings. The depositors are supplied with a small deposit book in which they are given credit for each deposit, and receive a moderate rate of interest on these deposits, together with a small additional contingent. The money received on deposit, and a portion of the capital, are loaned to trustworthy borrowers at a rate of interest determined by the market value, and the greater part of the earnings is set aside for the depositors. Banks of loan and discount buy credit paper, usually at a discount, and do a loan business. Private banking institutions are conducted by individuals, or an association of individuals, who do a general banking business. The business of banking is regulated by laws, which provide that the books be examined by competent accountants, and frequent statements are published to convey to the public information as to the stability of the enterprise. The laws and the condition of business requirements have made banking and banks secure, and render them absolutely necessary to promote successfully modern commercial enterprises.

Volume of Business. In 1929 there were 29,140 banks in the United States, which number included 7,710 national banks. The total capital was $6,114,203,000 and the individual deposits aggregated $42,954,121,000. In June of the same year the banks of Canada had a paid-up capital of $128,140,250, a circulation of $133,982,225, and deposits of $3,150,500,000. The government of Canada has had charge of a system of post office savings banks since 1868, which had 2,160 offices in 1929, while the total number of chartered banks was 14 and the number of branches, 4,480. See **Clearing House.**

BANKRUPTCY (băn̤k′rŭpt-sy̆), a term equivalent to insolvency, and generally applied to the financial condition of one who has failed in business. In general, a bankrupt or insolvent is one who is unable to pay *all* his debts. Bankruptcy laws have been enacted in most countries for the protection of both the debtors and the creditors. These provide for the fair distribution of the property remaining after bankruptcy among the creditors of the bankrupt. In some instances bankruptcy laws provide for a release from all debts remaining after applying the property in payment. The object of this is to release a bankrupt and offer to him an incentive to devote himself to business again. From 1867 to 1878 a national bankruptcy law was in force in the United States, while another was enacted in 1898. It applies to all individuals, but not to corporations. Both in Canada and the United States proceedings in bankruptcy may be instituted by the debtor or by creditors.

BANKS, Nathaniel Prentice, soldier and statesman, born at Waltham, Mass., Jan. 30, 1816; died Sept. 1, 1894. He received a common school education, worked in a cotton factory, and became a lawyer. Though a Democrat, he supported the principles of the Know Nothing party and held the view that the Democrats and the Republicans should form a coalition. He was elected to the Massachusetts Legislature and in 1852 entered Congress as a Democrat. He was reëlected by the Know Nothing party in 1854 against the Whig and Democratic candidates, and during his term served as Speaker of the House. In 1857 he became Governor of Massachusetts, and when the Civil War broke out he was placed in command of an army corps on the Potomac. He succeeded General Butler in command of the department of the Gulf in 1862. In 1863 he opened the Mississippi by capturing Port Hudson with 6,000 prisoners. He commanded the Red River Expedition in 1864, but was forced by General Richard Taylor to make a retreat. Soon after he was relieved of his command, when he resigned his commission and returned home. He served in Congress from 1864 to 1877, except in 1872, and was again elected in 1888. For many years chairman of the committee of foreign relations, he exercised a wide influence in national legislation.

BANKS, Thomas, sculptor, born at Lambeth, England, Dec. 29, 1735; died Feb. 2, 1805. In 1770 he received a gold medal at the Royal Academy, and subsequently studied sculpture in Rome, where he executed some works in marble purchased by Catherine II. of Russia. He returned to England in 1778 and soon after went on a second visit to Russia, where he made a group called "Armed Neutrality" for Catherine II. Other works of note executed by him include "The Mourning Achilles," "Cupid Catching a Butterfly," and "Caractacus Brought Prisoner to Rome."

BANNER (băn′nẽr), a flag or standard carried at the head of a band, either in a general parade or for military purposes. It may be national, state, local, or private. Its use is to indicate the line of march, or the rallying point in war, in case of defeat. Banners are made of bunting or a good grade of cloth.

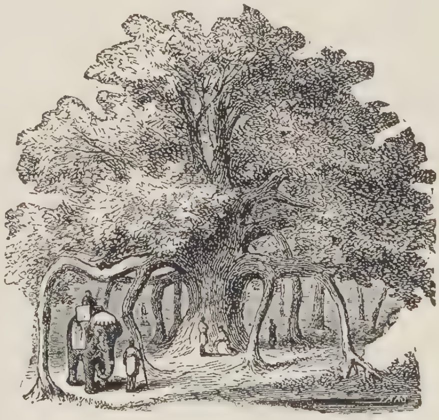
BANNOCKBURN (băn-nọk-bûrn′), a village in Scotland, two miles southeast of Stirling, on the Bannock Rivulet. It is famous for a decisive battle, in 1314, between King Robert Bruce of Scotland with 30,000 men and Edward II. of England with 100,000. The latter was defeated with a loss of 30,000 men.

BANTAM FOWL (băn′tam), a small domestic fowl that derived its name from Bantam, in Java. A well bred bantam does not weigh over a pound when full grown.

BANTING, F. B. See Insulin.

BANXRING (băn̤ks′rĭng), an insectivorous animal native to India and the East Indies. It has an elongated muzzle and a bushy tail. It is active and spry and spends much of its time in climbing the limbs of trees, resembling in this respect the lemurs and squirrels.

BANYAN (băn′yạn), or **Banian,** a tree native to the East Indies, Ceylon, and Australasia, and remarkable for its branches and roots. Every branch of the main tree throws out its own roots, which become parent trees and throw out other branches. The wood is light and of little value, but the tree yields lac and the bark possesses a tonic



BANYAN TREE.

property useful in treating diabetes. This tree lives many years and often covers large areas. One in India furnished shelter for 7,000 men, while another found in Australia covered nearly seven acres. A tree in India, known by the name *cubbeer burr,* has 350 large trunks and over 3,000 smaller ones. In these trees dwell large numbers of birds and monkeys, which are fond of their fruit, a kind of fig. The tree is held sacred by the Brahmans.

BAOBAB (bā'ô-băb), a tree native to tropical Africa, and met with in Senegal, Abyssinia, and the region of the African lakes. The trunk grows to a height of from 60 to 70 feet, and the growth of its limbs press outward about the same distance, making the diameter in many cases 150 feet. In the larger trees the roots are sometimes over 100 feet in length. The leaves are large and abundant and of a dark green color, and the large flower is white and has beautiful snowy petals. The fruit is a soft pulpy but dry substance, about the size of a quart flask, inclosed in a long dull-green woody pod. Between the seeds is a pulp which tastes like cream of tartar, and is used by the natives to give flavor to their porridge. The wood is soft and light, and when decay sets in the woodish structure becomes porous and finally falls to pieces. Cloth and rope are made of the fiber, and the juice of the fruit is used as a drink, but the wood is not particularly valuable. It was discovered by Michael Adanson and is sometimes called *adansonia.* Livingstone reported that one of the trees seen by him was at least 1,400 years old.

BAPTISM (băp'tĭz'm), a name derived from a Greek word which means to dip or wash, and is applied to a rite of many churches. The rite of baptism is administered by immersing in water, or by sprinkling or pouring water upon the person, and signifies purification or spiritual burial and resurrection with Christ or a union with Christ as our Savior and Lord. Early in the history of the Christian Church it was held that the two outward essentials of baptism are the use of water and the words of Christ as given in Matt. xxviii, 19. It is probable that immersion was the exclusive form used in the primitive church, which later became a trine immersion in respect to the Trinity. At that time sprinkling or clinical baptism, as it was called, was confined to the sick and aged. The Greek Catholic and a number of Protestant denominations practice immersion, while the Roman Catholic and most Protestants sprinkle or pour the water upon the head.

BAPTISTS (băp'tĭsts), one of the most numerous divisions of the Protestant church, whose origin in America is traced to Roger Williams, who embraced the Baptist faith in 1639. The creed is a modified form of Calvinism and the government is a pure democracy, in which all members have a right to vote on important church matters. They hold that infant baptism is not authorized, and that the ordinance of baptism should be administered by immersion. Most Baptist churches have a baptistry, either as a separate building or as an annex, in which the rites of baptism are administered. The number of Baptists in Canada is placed at 442,264. In the United States there are not less than thirteen separate organizations known by the name of Baptists. They have about 66,000 churches, valued at $160,500,000, and a membership of not less than 8,450,000. They possess 275 educational institutions in America, the property of which is valued at $35,000,000.

BAPTIST YOUNG PEOPLE'S UNION, a society organized under the direction of the Baptist church, and intended as a federation for young people. The object is to develop Christian character, to encourage the study of the Bible, and to bring together its members for the purpose of stimulating interest and building up membership in church and missionary work. *The Baptist Union,* a weekly publication, is the official organ, and the headquarters are in Chicago. This society has about 500,000 members.

BARABOO (băr'ȧ-bōō), the county seat of Sauk County, Wisconsin, thirty-five miles northwest of Madison, on the Baraboo River, and on the Chicago and Northwestern Railroad. It is surrounded by an iron, fruit, and grain producing country. The chief buildings include the high school, the county courthouse, and several fine churches. It has manufactures of machinery, dairy products, and linen and woolen goods. Waterworks, electric lights, and sewerage are among the improvements. Baraboo was incorporated in 1882. Population, 1905, 5,853; in 1920, 5,538.

BARBADOS (bär-bā'dōs), an island in the West Indies, of which it is the most easterly. It is twenty-one miles long and fourteen wide, and has an area of 166 square miles. It contains Mount Hillaby, 1,125 feet above the sea, and is surrounded by coral reefs. The soil is exceedingly fertile and produces tobacco, cotton, sugar cane, cereals, and tropical fruits. Among the exports are molasses, rum, sugar, and fruits. The imports include flour, rice, meat, clothing, and machinery. The little island, smaller than five congressional townships, is densely populated, and has considerable commerce. It was settled by the British in 1625 and is still a possession of Great Britain. Bridgetown is the capital and largest city. Population, 1921, 196,287.

BARBARIAN (bär-bā'rĭ-an), a term originated by the ancient Greeks, who called all foreigners and those unable to speak their language barbarians. According to Plato there were but two classes in the human family, the Greeks and the barbarians. The term was not used originally in reproach, but after the Persian invasion it implied hostility to the Greeks and their civilization. After the Roman conquest of Greece, the word *barbarian* was used in reference to all nations except the Greeks and Romans.

BARBAROSSA (bär-ba-rŏs'sȧ), a surname applied to Frederick I. of Germany. See **Frederick I.**

BARBAROSSA, meaning Red Beard, the name of three famous brothers, born in Greece, who became Turkish pirates. They established themselves in Algiers and ravished the shores of the Mediterranean. The oldest, named Aruch, was captured and beheaded in 1518; the youngest, named Hayraddin, conquered Tunis for Turkey. He died in Constantinople in 1546.

BARBARY (bär'ba-rĭ), a name sometimes applied to the northern portion of Africa, which includes Fez, Morocco, Tunis, Barca, Fezzan, and Algeria. The name was taken from the original inhabitants known as Berbers, who were conquered by the Arabs in the reign of the caliphs. The country was prosperous in the time of the Carthaginians, and, next to Egypt, it became the richest Roman province. In ancient times the district included Numidia, Mauritania, and Cyrenaica. It became infested with pirates in the 15th century, and was finally civilized after the conquest of Algeria by the French. At present it is inhabited by Berbers, Turks, Bedouins, Jews, Negroes, and French.

BARBARY APE, or **Magot,** a small tailless ape found in Northern Africa. It walks on four feet and is skillful in passing from tree to tree. The color is greenish-gray and in size it is not much larger than a cat. It is capable of being trained to perform tricks.

BARBECUE (bär'bḗ-kū), a term derived from the natives of the West Indies, now applied to the practice of roasting an ox or other large animal at a social entertainment on a large scale. In the southern part of the United States the name has reference to a jollification, especially to a political jubilee.

BARBEL (bär'bĕl), a fish of the carp family, of which species are found in the fresh waters of America and Europe. The common barbel of England is a game fish, but its flesh is coarse, and it measures from two to three feet in length. The binny or barbel in the Nile weighs about 60 pounds and is esteemed for food. Several species closely resemble the American sucker, but all have soft barbels growing from the snout and upper jaw, hence the name.

BARBER (bär'bẽr), a person whose business is to shave, trim, and cut hair. Formerly surgery was combined with the craft. In the time of Henry VII. laws defined the duties of barbers, and forbade higher surgical operations than bloodletting and tooth pulling. Barber shops were noted as news centers in classic times and they are still notorious for gossip. In many countries, as in some of the states of the United States, the practice of the barbers' art is limited by law to persons skilled by training, who are required to hold a certificate of qualification. A spirally decorated pole has long been the principal sign of barbers' shops.

BARBERRY (bär'bĕr-rȳ), a class of shrubs native to the temperate zones. Many of the species are evergreen, and some yield a sour berry which is useful in making jelly and preserves. The bark yields medicine and the roots are of value in preparing a yellow dye. The common barberry of Europe has been naturalized in Canada and the United States. It is thorny, has serrated leaves, and bears yellow flowers. Several species are native to North America.

BARBER'S ITCH, a disease of the bearded parts of the face, caused by a parasitic fungus. Postular eruptions of the face are sometimes confused with this disease, but they are really the result of close and too frequent shaving. In the true barber's itch, sometimes called ringworm in the beard, parasitic scales or sporules cover the infected beard.

BARBERTON, a city in Summit County, Ohio, 10 miles southwest of Akron, with which it is connected by several railways. It has many large factories, including chemical works, rubber factories, boiler works, and machine shops. The features include the high school, public library, brick paving, electric railways, and many churches. Population, 1920, 18,811.

BARBUDA (bär-bo͞o'dȧ), one of the Lesser Antilles, in the West Indies, 20 miles north of Antigua. It is of coral formation and has an area of 60 square miles. The surface is level and partly covered with forests, and cattle raising is the chief occupation. The island is a British possession. Population, 600.

BARCA (bär'kȧ), a district located between Egypt and the Gulf of Sidra, belonging to the Turkish Empire. It is bounded on the north by the Mediterranean and south by the Libyan Desert. The surface is hilly and mountainous, being traversed by highlands which reach an altitude of 3,310 feet. Agriculture and cattle raising are the chief industries. The exports are cattle, grain, ivory, and ostrich feathers. It was known to the Greeks as Pentapolis and contained five large Greek cities. The inhabitants consist mostly of nomadic Arabs and Berbers. Bengazi is the seat of government and the largest city. Population, 300,250.

BARCELONA (bär-sḗ-lō'nȧ), a city in Venezuela, capital of a state of the same name, 150 miles east of Carácas. It is situated on the Neveri River, three miles from its entrance into the Atlantic Ocean, and has railroad facilities and a good harbor. In the vicinity are coal and salt mines. Considerable trade is carried on in coal and fruit. A government house, the theater, and a number of educational institutions are located here. The first settlement was made at Barcelona in 1638, and in 1881 it became the capital of Bermúdez, which has been divided to form the two states of Sucre and Barcelona. Population, 12,785.

BARCELONA, formerly the capital of the kingdom of Catalonia, and now an important city in a province of the same name. It is the principal seaport on the Mediterranean, has railroad connection with the chief towns of the Iberian Peninsula, and next to Madrid is the most flourishing city of Spain. It consists of two parts, the new and the old. The former is modern and is platted on a regular plan, while the latter is irregular and ancient. A fine promenade extends from the Columbus monument to the Plaza de Cataluña. The cathedral occupies an elevated site that was formerly the location of a Roman temple and a Moorish mosque. It has manufactures of cannon, paper, machinery, woolen and silk goods, chemicals, wines, and clothing. It is an important city of commerce and has a large import and export trade. Gas and electric lights, pavements, waterworks, and street railways are among the improvements. It is the seat of a museum, an arsenal, a public library, a university, and other public institutions. The city was under the government of a line of counts until the 12th century, but in 1137 it became a part of the kingdom of Aragon. In 1640 it became French territory, but was made a part of Spain in 1652, and was retaken by the French in 1697. The Peace of Ryswick, in the same year, restored it to Spain. Population, 1905, 534,250; in 1920, 660,168.

BARCLAY (bär'klȧ), **Robert,** an eminent Quaker, born in Gordonstown, Scotland, Dec. 23, 1648; died Oct. 3, 1690. He studied in his native town and in Paris, where he embraced the Catholic faith, but later became a Quaker. For several years he traveled with William Penn and George Fox through Holland, Germany, and England to spread the doctrine of the Quakers. He published several able productions, and was held in high esteem. His chief writings include "Catechism and Confession of the Faith," "Treatise on Universal Love," and "Truth Cleared of Calumnies."

BARCLAY DE TOLLY (bär-klā' de tô-lē'), **Michael, Prince,** soldier, born in Livonia, Russia, Dec. 16, 1761; died May 14, 1818. He entered a Russian regiment and fought against the Turks and Swedes, and took a prominent part in two invasions of Poland. In 1809 he had charge of an army and invaded Sweden with 10,000 men. The following year he was appointed minister of war, which office he held three years. He commanded the Russian army during the invasion of Napoleon and was defeated by the French at Smolensk, and subsequently adopted the Fabian tactics of evading the enemy, which, though unpopular in Russia, was the means of destroying the French army. He was superseded by Kutusov in 1813, but was soon reinstated and commanded in the battles of Bautzen and Leipzig.

BAR-COCHBA (bȧr-koh'bȧ), **Simon,** the celebrated Jewish leader in the rebellion against Hadrian, Emperor of Rome, from 131 to 135 A. D. The events of his life belong to Jewish history. His reputation hinges largely upon the capture of Jerusalem in 132 A. D., which was followed by a general movement among the Semitic people to restore the Jewish kingdom. He was slain in 135, when the Romans reconquered Jerusalem and razed it to the ground. The general dispersion of the Jews dates from this final struggle to retain possession of the holy city.

BARD (bärd), a poet who celebrated in verse and song the exploits of heroes and chiefs. Mention was made in Roman writings of the bards of Gaul two hundred years before the advent of Christ, but these singers disappeared early among the people of the continent. The bards of the insular Celts continued important as social factors throughout the Middle Ages, probably because they maintained a form of organization. The Welsh bards are especially noted for their writings on a variety of subjects, including secular and religious themes. It is related that the Scottish bards were skilled in singing their productions to the accompaniment of the harp. Gray's "The Bard" is based upon the persecution of the Welsh bards by Edward I. of England, who looked upon them as promoters of sedition. In modern times the term is used as a synonym of poet.

BAREILLY (bȧ-rā'lē), or **Bareli,** a city in the Northwest Provinces of India, 151 miles east of Delhi. It is located on the Juá River, and has manufactures of carpets, cutlery, perfumery, and earthenware. The trade is chiefly in grain, sugar, and cotton. In 1857 it was the scene of a Sepoy mutiny, but the following year was recaptured by Lord Clyde. Population, 1921, 131,208.

BARGE (bärj), a double-decked passenger or freight boat that has no motive power of its own. It is attached to a towboat and used for conveying freight and passengers to shore from large vessels, or for pleasure excursions.

BARHAM (bär'am), **Richard Harris,** clergyman and author, born at Canterbury, England, Dec. 6, 1788; died June 17, 1845. He is known by the pen name of Thomas Ingoldsby. He studied at Oxford and was ordained in 1813, and in 1842 was appointed divine lecturer at Saint Paul's. "Ingoldsby Legends," a series of comic tales written by him, became very popular. He also published "Cousin Nicholas" and contributed to magazines and current periodicals.

BAR HARBOR, a noted summer resort in Mount Desert Island, off the coast of Maine, 45 miles southeast of Bangor. It is beautified by evergreen groves, mountain scenery, and highland lakes. The island has an area of 98 square miles and is famous as a resort for tourists. Bar Harbor has steamboat connections with the mainland and numerous hotels and villas. Population, 1900, 1,888; in 1920, 3,622.

BARI (bä'rê), a city in Italy, capital of a province of the same name, on the Adriatic Sea. It has a good harbor and railroad facilities, and is the seat of a brisk trade in almonds, cotton, cereals, fruit, and woolen goods. The chief manufactures are musical instruments, chemicals, soap, and furniture. It is the seat of an archbishop and has a number of fine ecclesiastical buildings, including the priory of Saint Nicholas. Anciently it was known as Barium and was a flourishing city in 200 B. C. Population, 1921, 109,841.

BARING BROTHERS (bā'rĭng), the name of a firm of noted British bankers, to which belonged a number of men who were prominent in English diplomacy. Francis and John Baring were sons of a German who settled in England early in the 18th century. The celebrated banking house known by their name was established in 1770, and has been a prominent factor in English finance since that time. In 1890 their South American securities depreciated in value and a crisis was averted by a loan of £13,000,000 from the Bank of England. This enabled them to tide over the difficulties, but they reorganized as a limited company on a less extensive scale.

BARING-GOULD (bā'rĭng-gōōld), **Sabine,** clergyman and author, born at Exeter, England, Jan. 28, 1834; died Jan. 2, 1925. He traveled in Iceland, in 1861, and two years later was appointed curate of Horbury and subsequently of Dalton. His writings are very numerous and relate to a diversity of subjects. The chief published works include "Myths of the Middle Ages," "Lost and Hostile Gospels," "Iceland, Its Scenes and Sagas," "Tragedy of the Caesars," "Village Sermons For a Year," "Germany, Present and Past," "A Book of Brittany," "History of the Church in Germany," "The Queen of Love," "In Troubadours' Land," and "A Book of the Riviera."

BARIUM (bā'rĭ-ŭm), a metal resembling strontium, found in nature in the form of sulphate, carbonate, and silicate. It is an alkaline earthy metal, fuses at a low temperature, and oxidizes readily. Baryta is an oxide of barium, an alkaline earth, and is sometimes called *heavy earth.* It is a virulent poison and is used in making white paint, such as *Hamburg white.* The chloride of barium is used to prevent boiler incrustations and the nitrate is employed to test sulphuric acid and soluble phosphates. Both are used in making fireworks.

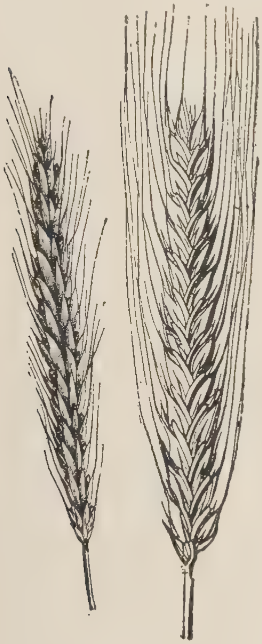
BARK (bärk), the outer covering of trees and plants, called *cortex* by botanists. The term, in a more limited sense, can be applied only to trees and shrubs of certain classes. In general it is found only on exogenous plants, while endogenous plants are destitute of true bark. The bark consists of several layers, as the inner or *bast,* which transmits the plant food; the intermediate or *green zone,* which fits the food for absorption, and the outer or corky layer, which protects the more tender inner layers. It contains valuable ingredients, such as gum and tannin, and also yields cork, fibres, and properties valuable in tanning. In nautics, a bark is a three-masted vessel with riggings on the fore and main masts like those of a ship.

BARK BEETLE (bē't'l), a small insect which is very injurious to trees. A number of species have been described, most of which are native to America and Eurasia. The female deposits her eggs in or under the bark, usually between the bark and the wood, and the young dig a series of burrows which cause decay. The trees are either killed outright or the value of the wood is injured. In 1783 the pine forests of Germany were invaded by great swarms of these insects. They are frequently destructive to orchards.

BARKER'S MILL (bärk'ẽrz mĭl), a machine invented in the 17th century, and used to produce rotary motion. It consists of an upright tube held in place by a frame, and at the lower end are two horizontal arms, on opposite sides of which are two small openings. The water is poured into the vertical tube and flows out of the small opening, causing the apparatus to revolve in the direction opposed to that of the water emitted. Devices to distribute water in sprinkling lawns and for making demonstrations in laboratories employ modified forms of this apparatus.

BARLETTA (bär-lĕt'tȧ), a city of Italy, located on an island in the Adriatic, and connected by a bridge with the mainland. It is about 35 miles northwest of Bari, with which it is connected by steam railway and electric lines. The streets are paved substantially with stone and asphalt. The city is surrounded by walls of stone. It contains a cathedral in the Byzantine style, a castle built by Charles V., and several fine statues and monuments. The export trade is largely in grain and fruits, and the manufactures consist of earthenware and cotton and woolen goods. Cannae, where the Romans were defeated by Hannibal in 216 B. C., is nine miles west of Barletta. Population, 1921, 42,022.

BARLEY (bär'lȳ), a valuable cereal plant, which is said to be more widely distributed than any other grain. It was an important food product in the early times of the Assyrians and Hebrews, and was used in the manufacture of beer by the Egyptians. It is now used mainly as feed for domestic animals, for making barley-meal bread, and in the manufacture of beer, porter, and whisky. The production is extensive in the Temperate Zone, where it yields from ten to fifty bushels per acre, the quality and quantity depending upon cultivation and richness of the soil. The heads of most species are bearded and contain two, four, or six rows of seeds. It colors easily, especially if harvested in damp weather. The best quality of barley is obtained in a moderately dry climate. Canada produces large quantities of a fine grade, especially the provinces of Manitoba, Alberta, and Saskatchewan, the first mentioned leading with an annual yield of about 15,500,000 bushels. The production of the United States has been about 175,500,000 bushels per year since 1918. California, Minnesota, South Dakota, and North Dakota are the leading barley producing states.



HEADS OF BARLEY.

BARLOW (bär'lō), **Francis Channing,** soldier, born at Brooklyn, N. Y., Oct. 19, 1834; died Jan. 1, 1896. He studied at Harvard, where he graduated in 1855, and served in the Union army in 1862-65. He took part in the battles of Fair Oaks, Antietam, and Gettysburg, and was mustered out with the rank of brigadier general. In 1865 he was elected secretary of state for New York, and was attorney general in 1872-73. He had charge of the prosecution of W. M. Tweed and those associated with him, and founded the Bar Association of New York City.

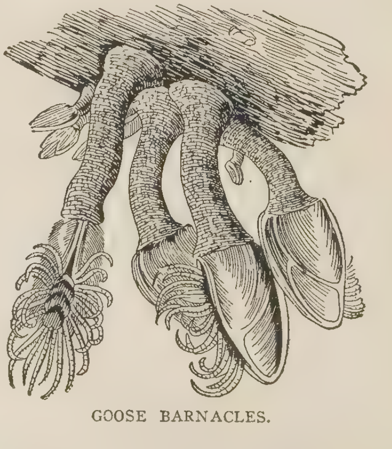
BARLOW, Jane, novelist, born in Dublin, Ireland, Oct. 17, 1860. Her father, J. W. Barlow, was vice provost of Trinity College in Dublin, where she was educated. Her writings include both verse and prose, and in a number she combines rare humor and sympathy in describing Irish village life. Among her books are "Irish Idylls," "The Battle of the Frogs and Mice," "Bogland Stories," "Creel of Irish Stories," "From the Land of the Shamrock," "The Founding of Fortunes," and "By Beach and Bogland."

BARLOW, Joel, poet, born at Redding, Conn., March 24, 1754; died Dec. 24, 1812. He studied at Dartmouth and at Yale and in 1780 entered the army as chaplain. Subsequent to the Revolutionary War he studied law and visited many of the European countries. He amassed a fortune by trade and speculation. In 1811 he was made ambassador to France and died near Cracow, Poland, while en route to meet Napoleon at Vilna. His chief writings are "The Columbiad," "Advice to the Privileged Order," and "Hasty Pudding."

BARMECIDE'S FEAST (bär'mē-sīd), an "Arabian Nights" tale, in which it is related that a member of the Barmecide family set empty dishes before a beggar and invited him to partake of imaginary dainties. The beggar took the joke good-naturedly and pretended to eat and drink. Becoming intoxicated on imaginary wine, he cuffed the ears of the host. This so pleased the latter that the beggar was served with a bounteous meal.

BARMEN (bär'men), a city of Germany, in Rhenish Prussia, on the Wupper River, about 25 miles northeast of Cologne. The chief buildings include the city hall, the municipal theater, a gymnasium, a public library, and numerous hospitals and educational institutions. Barmen has six railroads and a network of electric railways. It is one of the most important manufacturing cities of Germany, and produces the principal part of the ribbons made in Europe. Its fabrics, laces, thread, cotton, silk, and woolen goods are transported to all parts of the world. Other manufactures include musical instruments, buttons, machinery, and metal ware. The city has all modern municipal facilities, such as public parks, sewerage, stone and asphalt paving, electric lights, and central heating. In 1815, after the Napoleonic wars, it was annexed to Prussia, since which time it has grown rapidly in commerce and wealth. Population, 1920, 169,201.

BARNABAS (bär'nȧ-bas), or **Joses,** a religious teacher mentioned in the Acts of the Apostles as a coworker of Paul, who is spoken of as an apostle. He founded the first Christian community at Antioch, is reputed the Bishop of Milan, and is thought to have suffered martyrdom at Cyprus. The 11th of June is observed by the Catholic Church as St. Barnabas's day.



GOOSE BARNACLES.

BARNACLE (bär'nȧ-k'l), a marine animal of the lower order, generally called a *cirriped.*

Many species are common to all the oceans, differing in the manner of life and the method by which the adult is attached to some object. Among the best known are the *acorn barnacle* and the *goose barnacle*. The latter is so named because the ancients supposed that it produces the *barnacle* goose, a wild goose of the northwestern part of Europe. It is enveloped by a mantle and shell, possesses a long, flexible stock or peduncle provided with muscles, by which it fastens itself to floating objects, such as submerged timber or the bottom of ships. Its food consists of small marine animal life, which it secures from the water by its tentacles. The acorn barnacle, which has no stalk, is enveloped by a shell formed in the shape of an acorn, but composed of numerous valves. Some species were eaten by the ancients and are still esteemed as food by the Chinese. Darwin made a more extensive study of barnacles than of any other group of animals.

BARNACLE GOOSE. See **Barnacle.**

BARNARD (bär′nạrd), **Frederick Augustus Porter,** educator, born at Sheffield, Mass., May 5, 1809; died in New York City, April 27, 1889. His education was secured at Yale, where he taught for some time, and afterward became instructor in the Hartford Asylum for the Deaf and Dumb and later in a similar institution in New York. In 1837 he was elected to the chair of mathematics and philosophy in the University of Alabama, which he held for seventeen years. Subsequently he taught in the University of Mississippi and Columbia College, and was United States Commissioner to the Universal Exposition in Paris in 1867. He wrote many text-books in arithmetic, grammar, history, government, surveying, mathematics, and physics. He left his property to the Columbia University, which institution founded Barnard College for Women in his honor. His chief published works include "Undulatory Theory of Light," "History of the United States Coast Survey," "The Metric System," and "University Education."

BARNARD, Henry, educator, born at Hartford, Conn., Jan. 24, 1811; died July 5, 1900. He studied at Yale, where he graduated in 1830, was admitted to the bar, and served in the State Legislature from 1837 to 1840. In 1843 he was elected school commissioner of Rhode Island, and served as superintendent of schools in Connecticut from 1850 until 1854. In 1865 he was chosen president of the University of Wisconsin. He was made the first United States commissioner of education in 1867, and as such organized the bureau of education. As an educator he takes rank with Horace Mann, both as an organizer and in carrying out a systematic line of educational reforms. He published "Hints and Methods for the Use of Teachers," "Education in Factories," "School Libraries," "German Educational Reform," and "Pestalozzi and Pestalozzianism." He founded and for a number of years published the *American Journal of Education.*

BARNBURNERS (bärn′bûrn-ẽrs), a name given to the followers of Martin Van Buren at the time the Democratic party in New York was split into two factions. The name was derived from the case of the farmer who burned his barn to kill the rats, to which the party was likened, owing to the eagerness of some of the leaders to secure reforms. Their opponents were called the hunkers. In 1848 the Barnburners generally voted with the Free Soilers, making possible the election of the Whig candidate, Zachary Taylor.

BARNBY, Sir Joseph, musician, born at York, England, Aug. 12, 1838; died Jan. 28, 1896. He was educated at the Royal Academy of Music, London, and in 1875 became director of musical instruction at Eton. Subsequently he conducted the oratorio concerts at the Royal Albert Hall Choral Society, and composed anthems and other sacred compositions. Many of his songs and church music were popular and are still used extensively. "The Lord is King" is a cantata and "Rebekah" is an oratorio that gained much popularity. He edited "The Hymnary: A Book of Church Song."

BARNES (bärnz), **Albert,** theologian, born at Rome, N. Y., Dec. 1, 1798; died at Philadelphia, Dec. 24, 1870. He studied at Princeton Seminary, and became minister of the First Presbyterian Church at Philadelphia in 1830. He is the author of several commentaries and Bible reference books. His "Notes on the New Testament" was published in eleven volumes and had a large circulation. He was an opponent of slavery and prominent as a leader in the Presbyterian Church. His works include "The Way of Salvation" and "Lectures on Evidences of Christianity."

BARNEVELDT (bär′nẹ-vĕlt), **Jan van Olden,** grand pensioner of Holland, born at Amersfoort, Sept. 14, 1547; beheaded May 13, 1619. He was ambassador to England in 1585, and became head of the Republican party of Holland. When Prince Maurice was stadtholder to the legislature, he labored in the capacity of grand pensioner to effect a conciliation between the extremists in religious matters. In 1609 he concluded a truce with Spain for twelve years. In religious matters he supported the Remonstrants, who held to the doctrine of Free Will, while Maurice headed the Calvinists or Contra-Remonstrants. Maurice became offended and had him falsely convicted on charges of disloyalty and beheaded. Holland owed its political existence to Barneveldt, and his sad death is generally regarded a political wrong.

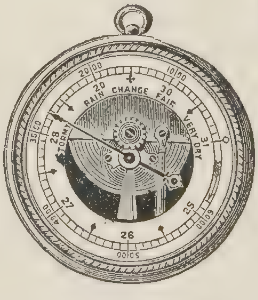
BARNEY (bär′nĭ), **Joshua,** noted seaman of the American Revolution, born in Baltimore, Maryland, July 16, 1759; died in Pittsburg, Penn., Dec. 1, 1818. He was appointed master's mate on the *Hornet* at the beginning of the Revolutionary War, and later served with distinction on board the *Wasp* and the *Virginia*. Subsequently he was commander of the ship *Ayder Ali,* and captured the British *General Monk* in 1782, for which service he was presented with a sword by the Legislature of Pennsylvania. From 1794 to 1800 he served in the navy of France. He commanded the flotilla which was to defend Chesapeake Bay, and was wounded at the Battle of Bladensburg, in 1814. President Monroe appointed him naval officer of the port of Baltimore in 1817.

BARNUM (bär′nŭm), **Phineas Taylor,** eminent showman, born at Bethel, Conn., July 5, 1810; died in Bridgeport, Conn., April 7, 1891. He started his business career in a village store and for some time sold lottery tickets, and in 1829 established *The Herald of Freedom* at Danbury, Conn., which proved unsuccessful. He next bought Joyce Heth, a Negro woman, said to have been 160 years old and a nurse of George Washington. Immediately he began to exhibit her for money, and was on the highroad to success when she died. He next went South and engaged in writing for newspapers, selling Bibles, and exhibiting Negro dancers, but soon removed to New York, where he purchased Scudder's American Museum. His principal attractions consisted of a white Negress, a Japanese mermaid, a woolly horse, and Charles S. Stratton, the famous Gen. Tom Thumb. His show venture caused him to realize good profits, and he accordingly enlarged by engaging Jenny Lind for 150 nights at $1,000 a night. With her he visited various large cities and sold tickets at auction. The choice seat for the first evening sold for $650, and the venture proved so successful that he netted the sum of $350,000. He lost some money in a clock venture, but soon recruited by lecturing and exhibiting Gen. Tom Thumb in England.

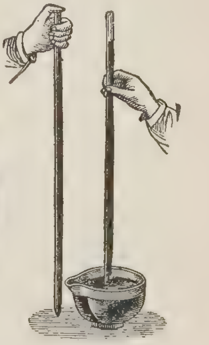
In 1871 Barnum organized his great hippodrome, circus, menagerie, and museum, which he carried through the country by means of 500 men and horses, and later with about one hundred railroad cars. His success is due largely to his liberality in advertising. To him is credited the remark, "The people want to be humbugged." Barnum was chosen a member of the State Legislature of Connecticut four different times, was mayor of Bridgeport, delivered numerous lectures, and wrote several books, among them the "Humbugs of the World," "Autobiography," "Struggles and Triumphs," and "Money Getting." The hippodrome represented a value of nearly $200,000. His great elephant "Jumbo" was purchased in London for $10,000. While exhibiting at Boston for ten consecutive days, he realized $105,000. He was a liberal and interesting man. His gift of a museum building to Tufts College, near Boston, was one of the many good turns made by the great showman.

BARODA (bȧ-rō′dȧ), a city of India, 230 miles north of Bombay, with which it is connected by railway. It occupies a prominent site on the Vishvomitri River, which is crossed by several stone and steel bridges. The chief buildings include an ancient palace, the Anglican church, the Baroda College, a public library, and the Dufferin hospital. It has a large trade in grain, merchandise, and live stock. The district of Baroda, of which it is the capital, has been tributary to the British since 1802. Many modern improvements, such as waterworks and electric lights and street railways, have been built since European occupation began. Population, 1921, 103,790.

BAROMETER (bȧ-rŏm′ē-tẽr), an instrument used in measuring atmospheric pressure. Owing to the even pressure of air on all sides of an object, many centuries elapsed before it was demonstrated that air possesses weight. The discovery was announced by Torricelli, an Italian, in 1643. By the use of the *Torricelli tube,* which is essentially the same as a barometer, he discovered that the pressure or weight of the atmosphere supports a column of mercury thirty inches high. The same experiment was repeated by Pascal in 1645. In 1656 Perrier discovered that the height of the mercury varies with the weather; when the air is moist it is lighter than when dry, and, therefore, the mercury rises in the dry air and falls when it becomes more humid. This fact discovered, it became possible to note the state of the atmosphere as to the quantity of moisture contained in it, and to determine the altitude of a given locality above the level of the sea, for the reason that the pressure of the atmosphere is greatest at the level of the sea and gradually decreases toward the higher altitudes. Hence, in low altitudes mercury rises in the tube, and it gradually falls as the barometer is carried upward from the level of the sea.



ANEROID BAROMETER.



LIQUID BAROMETER.

The barometer is constructed according to well established rules. A glass tube about thirty-three inches long, closed at one end, is filled with mercury. After closing the open end with a finger, the tube is reversed and dipped below the surface of the mercury in a vessel. When the finger is removed from the opening, a column of mercury remains in the tube, being sustained there by the pressure of the atmosphere. This column is about thirty inches high near the level of the sea; in high elevations it is much lower. The weight of the mercurial column is equal, in all cases, to that of a column of air equal in weight, extending from the level of the vessel to the top of the atmosphere. As above stated, the mercury rises or falls in proportion to the pressure of the atmosphere, which is varied by altitude and moisture. Thus, the mercury rises with increased pressure and falls when pressure is diminished. At the top of Mont Blanc, about 5,243 yards high, mercury falls to sixteen and one-half inches. In 1875 two Frenchmen, Sivel and Corce-Spinelli, lost their lives from asphyxia while ascending in a balloon; at the height of 9,370 yards the mercury fell to ten inches. This was due to the fact that the higher the ascent the less air remains overhead. For this reason, the less the air presses down, the less power it has to sustain a column of mercury. In the *aneroid barometer* no liquid is used; it depends for its operation on the pressure exerted by the air upon its surface.

Much study has been given to weather forecasts based on the condition of the atmosphere as indicated by the barometer. A number of governments and yachting clubs make careful observations with the barometer. They are guided largely by its registrations. A rapid rise of the barometer indicates unsettled weather; a gradual rise indicates settled weather; a rapid fall indicates stormy weather. Besides these rules are a number of others dependent largely upon location and the direction of the winds. It is certain that many lives and much property have been saved by careful observations of coming storms indicated by barometric action.

BARQUISIMETO (bär-kē-sē-mā'tō), a city in Venezuela, capital of the state of Lara, on the Barquisimeto River. It is surrounded by a fertile plain and has a good trade in cereals and live stock. A cathedral, the government palace, and a college are among the public buildings. The first settlement made in its vicinity by the Spaniards dates from 1522, hence it takes rank with the oldest cities in America. In 1812 it was destroyed by an earthquake, but was soon rebuilt, and became the capital of a state of the same name in 1830. The state of Lara is part of the former state of Barquisimeto. Population, 1919, 41,360.

BARR, Amelia Edith, novelist, born in Ulverton, England, March 29, 1831. She was educated at Glasgow. In 1854 she removed with her husband, Robert Barr, to Texas, and in 1869 went to New York City to engage in literary work. Her writings are chiefly novels, based largely on scenes in Scotland and England, and include a number of historical tales. Among her chief books are "Romance and Reality," "The Hallam Succession," "Jan Vedder's Wife," "Remember the Alamo," "A Border Shepherdess," "The Maid of Maiden Lane," "The Lion's Whelp," and "Between Two Loves." She died March 10, 1919.

BARR, Robert, novelist, born in Glasgow, Scotland, Sept. 16, 1850. He came to Canada at an early age and attended the Normal School at Toronto, after which he was head master of a school in Windsor for a number of years. In 1876 he joined the editorial staff of the *Detroit Free Press,* to which he contributed under the name *Luke Sharp.* He removed to London in 1881 and with Jerome K. Jerome founded the *Idler* as a monthly magazine. His story, "In the Midst of Alarms," is based on the attempted Fenian invasion of Canada. His books include "A Woman Intervened," "The Countess Tekla," "The Face and the Mask," "The Unchanging East," and "The Tempestuous Petticoat." He died Oct. 22, 1912.

BARRANQUILLA (bär-rån-kēl'yå), a seaport in Colombia, on the Magdalena River, fifteen miles from the Caribbean Sea. It is connected with Sabinilla, its port on the Caribbean, with a railroad. Formerly only the smaller boats could navigate the Magdalena at this point, but it has been improved by dredging and now admits the larger vessels. The city has a large trade in produce and is improved with modern public utilities. Population, 1922, 40,115.

BARRAS (bå-rå'), **Paul François Jean Nicolas, Comte de,** revolutionist, born at Fox-Amphoux, France, June 30, 1755; died Jan. 29, 1829. In early youth he became a soldier in India in opposition to the British. After attaining to the rank of captain, he returned to France and joined the revolutionary party with the hope of regaining his dissipated fortune. He rapidly rose to eminence and became a member of the national convention in 1792, in which he opposed the royalists and voted for the execution of the king. At Toulon he conducted a siege against the royal insurgents. His energy and activity in the southern part of France caused the revolutionary party to triumph in that part of the country. In 1794 he aided in the overthrow of Robespierre, and the next year became commander in chief of the army, but later yielded to the rising popularity of Napoleon Bonaparte. He wrote personal memoirs of importance, but they were seized by the government on the charge that they were treasonable, but they were subsequently published. Much of his later life was devoted to planning against the government, his political career having ended by the ascendency of Napoleon in 1799.

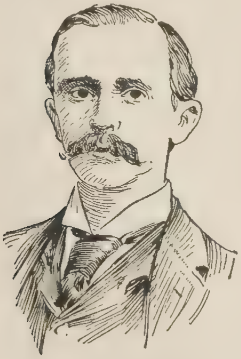
BARRE (băr'rē), a city in Washington County, Vermont, about six miles southeast of Montpelier, on the Vermont Central and the Montpelier and Wells River railroads. The manufactures consist chiefly of monuments and building materials made of Barre granite, which is quarried extensively in the vicinity. Among the principal buildings are the public library, the Goddard Seminary, and the high school. The first settlement was made in the vicinity in 1788 and it was incorporated in 1894. Population, 1900, 8,448; in 1920, 10,008.

BARREL (băr'rĕl), a vessel formed of *staves* and surrounded by *hoops.* The staves are fitted carefully and held together tightly by the hoops, and at the two ends of the barrel are circular boards called the *heads,* which are fitted in grooves. Most barrels bulge in the middle, in which the staves are wider in the middle than at the ends, but some are larger at the lower end. A *bunghole* is provided for the purpose of allowing the inflow and outflow of liquids.

Many articles of commerce are sold in barrels, but the market value is based upon the quantity in pounds. Thus, a barrel of flour contains 196 and a barrel of pork 200 pounds. The barrel, in wine measure, contains 31½ gallons, and the imperial barrel of England contains 36½ gallons of beer. A barrel of butter consists of 224 pounds.

BARRETT (băr'rĕt), **Lawrence,** Shakespearian actor, born at Paterson, N. J., April 4, 1838; died March 20, 1891. He was noted as an accomplished actor in America and Europe, played with Booth in New York, and in many large cities. He wrote "Life of Edwin Forrest." His chief rôles were in "Julius Caesar," "King Lear," and "Yorick's Love."

BARRIE (băr'rĭ), a town in Ontario, capital of Simcoe County, fifty-six miles northwest of Toronto. It is nicely situated on Lake Simcoe, a beautiful sheet of water about thirty miles long and twenty-six wide, and the surrounding country is fertile. It is the seat of a collegiate institute and several churches and schools. The manufactures embrace leather, woolen goods, flour, and machinery. Steamboats run on the lake from the town, which is popular as a summer resort. Population, 1921, 6,992.



J. M. BARRIE.

BARRIE, James Matthew, novelist, born at Kirriemuir, Scotland, May 9, 1860. He graduated at Edinburgh University in 1882 and soon after took up journalism in Nottingham and London. In his writings much pathos and humor is employed in delineating Scotch life, and a number of his books have been dramatized. His chief publications include "A Window in Thrums," "The Little Minister," "When a Man's Single," "The Little White Bird," "The Wedding Guest," "Quality Street," "Little Mary," "Alice-Sit-by-the-Fire," and "The Professor's Love Story."

BARRIER REEF (băr'rĭ-ẽr rēf), a coral reef extending from ten to one hundred miles off the northeast coast of Australia, 1,265 miles in length. The reef is precipitous and rises from great depths. The trip from Sidney to Torres Strait is usually made by the inner route, where the sea is twelve fathoms deep. The passage is narrow, but it is less dangerous than the outer route. A vast region is covered by the Barrier Reef, about 100,000 square miles, and the surrounding waters yield pearls and trepang.

BARRON (băr'rŭn), **James,** naval officer, born in Virginia in 1769; died April 21, 1851. He served in the navy under his father, who had chief command of the navy organized by the commonwealth of Virginia, and in 1798 became first lieutenant in the United States navy. In 1807 he was given command of the *Chesapeake* and sailed from Hampton Roads for the Mediterranean. While en route the *Chesapeake* was attacked by the British frigate *Leopard,* and Barron was compelled to surrender three of his crew alleged to be British deserters. The action of the captain of the *Leopard* was repudiated by the British government. In the United States it was generally thought that Barron did not exercise due diligence in protecting his crew, of which three were killed and eighteen wounded. This caused him to be suspended from active service for five years, and, believing Commodore Decatur in a measure responsible for his discharge, he challenged the latter for a duel and mortally wounded him at Bladensburg, Md., in 1820. Barron was seriously wounded, but recovered and became the senior officer in the navy in 1839.

BARROW (băr'rō̇), the name given to mounds of earth constructed anciently for burial and monumental purposes. Many found in Great Britain are supposed to belong to the period of the Roman invasion. Eurasia, Northern Africa, and the Mississippi valley of North America are especially rich with these evidences of former populations. Many are long, others are in the form of a bell or cone, and some are broad barrows. Homer's "Iliad" mentions similar artificial mounds in connection with the obsequies of Achilles and Hector. See **Mound Builders.**

BARROW, a river of Ireland, rises in Queen's County, on the northeastern slope of the Slieve Bloom Mountains. After a course of 120 miles it unites with the Suir River and flows through Waterford Harbor into the sea. It is navigable twenty-five miles from its mouth, as far as New Ross.

BARROWS, John Henry, clergyman and educator, born in Medina, Mich., July 11, 1847; died in 1902. He studied at Yale and at Andover, and subsequently attended the university at Göttingen, Germany. In 1881 he became pastor of the First Presbyterian Church in Chicago and administered to its needs until 1896. He was the organizer and president of the World's Parliament of Religions held at the Columbian Exposition in Chicago in 1893, and subsequently made a tour of the world In 1898 he became president of Oberlin College, Ohio. His books include "The Gospels are True Histories," "History of the World's Parliament of Religions," "The Christian Conquest of Asia," "Life of Henry Ward Beecher," and "I Believe in God."

BARROWS, Samuel June, author, born in New York City, May 26, 1845. He studied theology and telegraphy and was a newspaper reporter. For two years, beginning in 1867, he was secretary to William H. Seward, and in 1874 studied at the University of Leipzig, Germany. He became pastor of the First Unitarian Church in Boston in 1876, and edited several periodicals devoted to the Unitarian faith. In 1897 he was elected to Congress as a Republican, and was a delegate at the congress of arbitration in Brussels in 1897, at Christiania in 1899, and at Paris in 1900. His chief books are "The Doom of the Majority of Mankind," "The Shaybacks in Camp," "A Baptist Meeting-House," "The Staircase to the Old Faith, the Open Door to the New," "The Isles and Shrines of Greece," and "Crimes and Misdemeanors." He died April 21, 1909.

BARROW STRAIT, a narrow channel extending from Lancaster Sound and connecting Baffin Bay with Melville Sound. It was so named from Sir John Barrow, a British traveler, though Parry discovered it in 1819.

BARRY (băr'rĭ), **Alfred,** bishop, born in London, England, Jan. 15, 1826. He studied at King's College, London, and Trinity College, Cambridge, and for some time was chaplain in ordinary to Queen Victoria. In 1884 he was made primate of Australia and bishop of Sydney. He resigned his see in 1889, and became cannon of Windsor and afterward rector of Saint James's, Piccadilly. He wrote "Introduction to the Old Testament, Christianity and Socialism," "England's Mission in India," and "The Christian Sunday." He died April 1, 1910.

BARRY, Sir Charles, architect, born at Westminster, England, May 23, 1795; died May 12, 1860. He made a study of the architecture of Italy and Greece and designed the Manchester Athenaeum. His designs for the new houses of Parliament at Westminster were accepted in preference to those of his competitors and work was commenced after his plans in 1840. He was knighted and in 1844 chosen a Royal Academician.

BARRY, John, naval officer, born in Tacumshane, Ireland, in 1745; died Sept. 13, 1803. He came to America at the age of fifteen years and settled at Philadelphia, where he acquired wealth and influence. In 1776, at the beginning of the Revolution, he was appointed commander of the *Lexington* and captured the *Edward,* the first British ship to be taken by an officer of the United States navy. The following year he captured a British war vessel in the Delaware, and in 1781 captured two other British vessels. In 1794 he was senior officer with the rank of commodore.

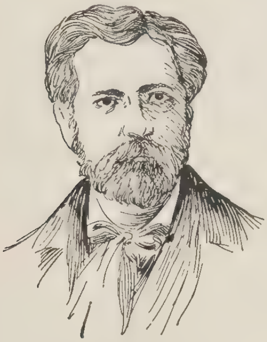
BARRY, William Farguhar, soldier, born in New York City, Aug. 18, 1818; died July 18, 1879. He took military training at West Point, where he graduated in 1838, and fought against the Seminoles in Florida. In the Mexican War he was on the staff of Maj. Gen. Worth, and subsequently took part in expeditions against the Indians in Dakota and Utah. He was chief of artillery of the Army of the Potomac at the beginning of the Civil War, and was brevetted brigadier general for gallant services in the campaign against Gen. Johnston. He published "A System of Tactics for the Field Artillery of the United States."

BARRYMORE (băr'rĭ-môr), **Maurice,** actor and playwright, born in India in 1847; died March 25, 1905. He was educated at the University of Cambridge, England, and began a successful career as actor. In 1875 he made a tour to the chief cities of Canada and the United States. He played successfully with Mrs. Bernard Beere, Mrs. Langtry, Madame Modjeska, and Olga Nethersole. His play "Nadjeska" was presented many times by Madame Modjeska and became very popular.

BARTER (bär'tẽr), the term used in economics to express the exchange of one commodity for another, as contrasted with the sale of commodities for money. In primitive times barter was extensive, each individual exchanging the surplus of his own products for such surplus products of others as he himself might desire. Instead of paying money for clothing or food, the primitive man traded a pig for a sheep, or several commodities for one of greater value than either. This system was conducted in the primitive states of all communities, and still prevails more or less among savage people. The terms *barter* and *sale* are used at present as interchangeable by many courts.

BARTH (bärt), **Heinrich,** African explorer, born in Hamburg, Germany, May 19, 1821; died Nov. 25, 1865. In 1844 he was granted the degree of Ph. D. at the University of Berlin. His explorations included all the countries bordering on the Mediterranean Sea, the Sahara, and the entire course of the Niger. He published reports of his travels from time to time, which embrace descriptions of routes covering more than 15,000 miles. His writings include many valuable geographical and historical works. The best known are "Travels and Discoveries of Central Africa," "Explorations of the Shores of the Mediterranean," and "Vocabularies of Central Africa."

BARTHOLDI (bär-tôl-dē′), **Frédéric Auguste,** French sculptor, born in Alsace, Germany, April 2, 1834; died Oct. 4, 1904. He first engaged in painting, but soon abandoned that art to devote himself to sculpture. His best known production is the "Colossal Statue of Liberty Enlightening the World," which was completed in 1884, and was presented by France to the United States. It is located on Bedloe's Island, in New York Harbor. "The Lion of Belfast," a fine work of art, is considered his masterpiece. Other works include the statue of Lafayette, in New York, and the busts of Erchmann and Chatrain. He was presented with the cross of the Legion of Honor in 1865, and was the commander of that organization for several years. See **Liberty, Statue of.**


F. A. BARTHOLDI.

BARTHOLOMEW (bär-thŏl′ô-mew), **Saint,** one of the twelve apostles, supposed to be the same person as Nathaniel. Little is known of him and his labors, and, according to Eusebius, he preached the Gospel in Arabia.

BARTHOLOMEW FAIR, an exhibition held under a charter issued by Henry I. at West Smithfield, London, from 1133 till 1855, on Saint Bartholomew's day, Aug. 24th. It was long a center of amusement and games, but began to lose its trade after 1685.

BARTHOLOMEW, Massacre of Saint, the name applied to a slaughter of French Protestants on the night of Saint Bartholomew's day, Aug. 24, 1572, with the sanction of Charles IX., influenced by his mother, Catherine de Médici. She was the regent of her son Charles during his minority, and a long war raged between the Catholics and Huguenots. With the pretense of friendship, she made overtures to the Huguenots, which resulted in a peace treaty. She married her daughter Margaret to Prince Henry of Navarre, later Henry IV., who was leader of the Huguenots, and appointed Admiral Coligny, an influential Huguenot, to an important position in the kingdom. Admiral Coligny was invited to the court of the king and honored as a father. The admiral was wounded by a shot on Aug. 22, and the king hastened to his relief and promised punishment to the offender, but later his mother induced him to believe that the admiral desired to take his life. A council was held, and Aug. 24 was fixed for the night of the execution. Accordingly, Admiral Coligny was murdered, and a bell from the royal palace at midnight gave the signal for the commencement of the massacre. The bloody slaughter was promptly commenced and carried to all parts of France. It is said that the two Huguenot princes, Condé and Henry of Navarre, saved their lives by denying their religion, but this is not admitted by good authorities. According to Sully, 70,000 Huguenots, including women and children, were murdered. However, the object designed was not accomplished, and the king was required to grant liberty of conscience soon after to all citizens of France.

BARTLESVILLE, county seat of Washington County, Oklahoma, on the Santa Fé and the Kansas City Southern railways. It has fine buildings, such as the high school, court house, public library, and many churches. Other features include paving, sanitary sewers, electric street railways, and manufactures of glass, brick, cigars, and machinery. It was incorporated in 1897. Population 1920, 14,417.

BARTLETT (bärt′lĕt), **Samuel Colcord,** clergyman, born at Salisbury, N. H., Nov. 25, 1817; died at Hanover, N. H., Nov. 16, 1898. He graduated from Dartmouth College in 1836, and was its president from 1877 to 1892. His writings include "From Egypt to Palestine" and "Sources of History in the Pentateuch."

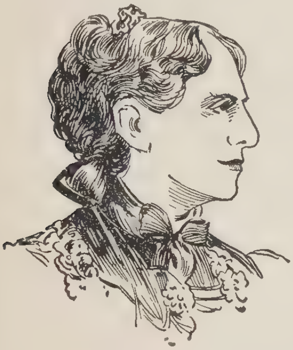
BARTOLINI (bär-tô-lē′nē), **Lorenzo,** Italian sculptor, born in Tuscany in 1777; died Jan. 20, 1850. He came to Paris while young, where he studied and worked. After the Battle of Waterloo, he resided mostly at Florence. Among his finest works are "Charity," "Hercules," Lycus," a magnificent bust of Napoleon, and a monument in memory of Lady Stratford Canning. He ranks next to Canova among modern Italian sculptors.

BARTOLOMMEO (bär′tô-lô-mā′ô), **Fra,** the assumed name of Baccio della Porta, painter, born in Florence, Italy, in 1475; died in 1517. He studied in Florence, where he formed a close friendship with Raphael, whom he assisted in a number of works. "The Annunciation," now in the Louvre at Paris, is one of his most celebrated works. Other works of high repute include the painting of Saint Paul in the Pitti Palace, the frescoes in the convent of San Marco, and "The Virgin upon the Throne," in Florence.

BARTOLOZZI (bär-tô-lôt′sē), **Francesco,** engraver and designer, born in Florence, Italy, Sept. 21, 1728; died in April, 1813. He studied under Joseph Wagner at Venice, and in 1764 removed to London, where he spent forty years and produced his best work. He went to Lisbon in 1805 to superintend a school of engraving and remained there until his death. His engraving of Carlo Dolce's "Virgin and Child" and several works in Boydell's Shakespeare gallery are among his best known.

BARTON (bär′tŭn), **Bernard,** poet, born in London, England, Jan. 31, 1784; died Feb. 19, 1849. He was popularly known as the Quaker poet. His writings are tempered with tenderness and a religious spirit. Through the efforts of Sir Robert Peel, he received a pension of £100. Among his chief books are "Metrical Effusions," "Napoleon and Other Poems," "Household Verses," and "The Reliquary."

BARTON, Clara, philanthropist, born in Oxford, Mass., in 1821; died April 12, 1912. She studied at Clinton, N. Y., and became a teacher at Bordentown, N. J. Later she engaged as a clerk in the government patent office at Washington. At the beginning of the Civil War she became devoted to the care of wounded soldiers and was placed in charge of hospitals of the army of the James. In 1865 she marked the graves of Union soldiers at Andersonville, Ga. Beginning in 1866, she devoted several years to lecturing, both in America and Europe. In the war between Germany and France she served as assistant to the Grand Duchess of Baden in the establishment of field hospitals, and was awarded the golden cross of Baden and the iron cross of Germany. In 1881, when the American Red Cross Society was organized, she became its president. She was the representative of this organization at a conference at Geneva, Switzerland, in 1884, and served as a delegate at the International Peace Convention at the same place and time. She held the position of commissioner of foreign exhibits at the New Orleans Exposition. At the request of the United States Senate, in 1883, she prepared the "History of the Red Cross," which was published at Washington by the government. In 1896 the Red Cross Society of America collected funds to relieve the sufferers of the Turkish oppression in Armenia, and she proceeded thence as the representative of the society, though the Sultan of Turkey reluctantly granted her permission to relieve Armenian sufferers. In 1898 she rendered valuable services in Cuba during the Spanish-American War. Mrs. John A. Logan succeeded her as president of the Red Cross Society in 1904. She published "History of the Red Cross in Peace and War."


CLARA BARTON.

BARTON, Sir Edmund, statesman, born in Sydney, Australia, Jan. 18, 1849; died Jan. 4, 1920. He graduated at Sydney and soon began a successful political career. In 1883 he became speaker of the legislative assembly, serving until 1887, when he was appointed attorney general. He was a member of the federal conventions in Sydney and Adelaide and a leader in the movement for federation in Australia. In 1901 he became prime minister and minister of external affairs in the Australian cabinet.

BARTRAM (bär'tram), **John,** botanist, born near Darby, Pa., March 23, 1699; died Sept. 22, 1777. He laid out a botanical garden on the Schuylkill River, near Kingsessing, and made a large number of collections. George III. appointed him honorary botanist of America and Linnaeus referred to him in terms of praise.

BARUCH (bā'ruk), a Hebrew scribe of the 6th century B. C. He is mentioned as a friend and companion of Jeremiah, the prophet, and accompanied him to Egypt (Jer. xxvi., 4; xxxii., 13). The Book of Baruch, a part of the Apocrypha, is admitted as a part of the canon of the Holy Scriptures by the Roman Catholics, but Protestants and Jews consider it Apocryphal.

BARUCH, Bernard Mannes, public man, son of Simon Baruch (born in 1840), the eminent German-American physician. He operated successfully on the New York Stock Exchange. President Wilson appointed him a member of the Council of National Defense. In 1916 he was made purchasing agent for the War Industrial Board, of which he became chairman in 1918.

BARYE (bȧrē'), **Antoine Louis,** sculptor, born in Paris, France, Sept. 24, 1795; died June 25, 1875. After serving in the army in 1812-14, he completed his studies under several prominent sculptors. His reputation is based largely upon "The Tiger Tearing a Crocodile" and "The Jaguar and the Gazelle."

BARYTA (ba-ri'ta). See **Barium.**

BASALT (bȧ-sạlt'), an igneous rock belonging to the trap-rock variety, frequently columnar in structure. Its origin is due to great pressure on the interior of the earth, in remote geological ages, forcing melted rock through fissures of other rock formations. On cooling, the mass formed what is known as *dikes.* These vary in width from several inches to three or four yards. They are much harder than the rock through which they were forced, and usually extend above the general surface, owing to the fact that they are less subject to corrosion. Many attain a height of five to 160 feet. The columns are generally in the forms of a pentagon, hexagon, or octagon. They are found in various parts of the continents, and are most numerous near the borders of mountainous districts. There are columns of basalt at the Giant's Causeway in the northern part of Ireland, in Scotland, at Fingal's Cave, and various parts of the Island of Staffa. On the northwestern coast of Lake Superior are examples of basalt. The Columbia River, in Washington, has extensive cliffs formed of basaltic columns.

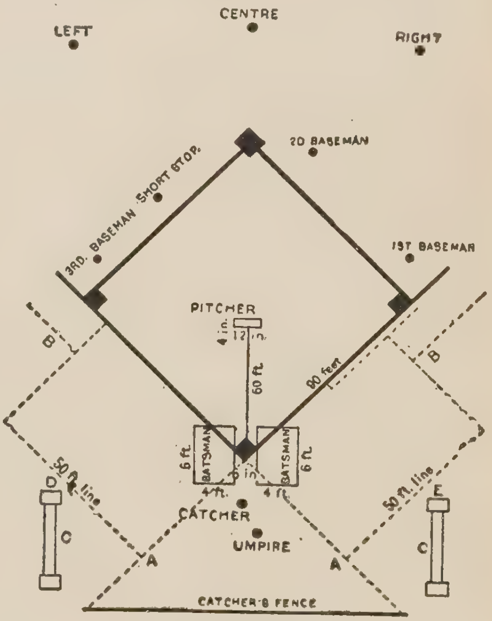
BASCOM (băs'kŭm), **John,** educator, born in Genoa, N. Y., May 1, 1827. He studied at Williams College and Andover Theological Seminary, and in 1855 became professor of rhetoric at Williams College. In 1874 he was elected president of the University of Wisconsin, where he held the chair of mental and moral philosophy. He taught political science at Williams College from 1887 to 1901, and was prominent as a lecturer on educational and religious subjects. He published the "Principles of Phsycology," "Problems in Philosophy," "God and His Goodness," "The Philosophy of English Literature," and "The Growth of Nationality." He died Oct. 2, 1911.

BASE (bās), a term used in chemistry to describe a substance which has the power to unite with an acid and with it form a salt. Water is formed in the process and the metal takes the place of the hydrogen of the acid. A base may be either an oxide or a hydroxide, lime or calcium oxide being an example of the former and potassium hydroxide of the latter. The salt potassium nitrate, or saltpeter, is formed when potassium hydroxide acts upon nitric acid, while the salt sodium sulphate results from the uniting of sodium hydroxide and sulphuric acid. Bases may be either oxygen, as those mentioned above, or they may contain sulphur, iodine, chlorine, bromine, and flourine. The alkaloids, or organic bases, found in many plants, contain nitrogen. They are considered as substitution compounds of ammonia.

BASEBALL (bās'bạl), an athletic game regarded national in America. The simpler game known as *town ball* was played in the United States until 1857, when baseball began to be played by amateurs. It continued to attract little attention until 1871, when professional organizations were instituted. Soon after it was introduced into England and other countries. In 1884 the National Association of Baseball Players was organized, and this was succeeded two years later by the National League of Professional Clubs.

The game has been brought to a high standard by the development of professional skill, the adoption of standard rules, and the cultivation of a public interest sufficient to cause attendance in large numbers at public exhibits. Many high schools, colleges, and universities have clubs and give much time and attention to the development of professional skill. The larger number of the clubs of the National League and of the American League devote most of their time, in the playing season, to public exhibits and from gate receipts secure handsome incomes. In 1874 several clubs visited England and Ireland, where they played fourteen exhibition games. One of the most noted tours was made in 1888-89, when the Chicago club and a team gathered promiscuously, known as the All-American, made a tour of the world. They visited and played at Honolulu, Sidney, Auckland, Melbourne, Colombo, in Ceylon, at the Pyramids of Egypt, Rome, Naples, Paris, London, and many other great cities of the world.

The game is played with a ball and bat. The ball weighs about five ounces avordupois, and is about nine inches in circumference. The bat is made entirely of wood, but may have twine wound around the handle, and cannot exceed forty-two inches in length. There are nine players on a side, who play on a diamond-shaped piece of ground ninety feet on each side, the corners being bases. The field is taken by one side, and the other side has a man at the bat. The field side has a pitcher located inside the ground, near the center in front of the batsman; he throws the ball to the batsman, who has a position on the home base, and who makes an effort to drive it with the bat out of the reach of the fielders and to such a distance as to enable him to run around the bases and make a score. If he fails to drive the ball far enough to make a complete round, he stops at one of the bases and is followed by another batsman. If he is touched by the ball before reaching a base, he is out, and, when three of his side are out, the side at the bat takes the field. A game includes nine innings, and the side making the highest score wins.



BASEBALL GROUND.

AA, Reservation for batsman, catcher, and umpire; *BB*, for captain and assistant; *CC*, benches for players; *D*, visiting players' bat-rack; *E*, home players' bat-rack.

The games played by the professional clubs are attended by newspaper reporters and telegraph operators are located at instruments near at hand, who send the news of the progress made to all parts of the country. Many times bulletin boards are posted in conspicuous places at the games and in many cities far remote, at which interested spectators may learn of the

(Opp. 240.)

Stadium of Harvard University.

Here, in 1917, 40,000 people witnessed the Yale-Harvard football game.

progress and results. It is not unusual for the national and international games to be attended by 15,000 to 40,000 spectators, as was the case at the great games played between the teams of various cities in 1926. While the game is easily understood, much practice is required to become skilled in its arts. Elaborate rules have been provided for the guidance of individual players and associations. These are changed or amended by national representative conventions from time to time, and are consulted as a guide in all the amateur and professional games.

BASEDOW (bä'ze-dō), **John Bernhard,** educational reformer, born at Hamburg, Germany, Sept. 11, 1723; died July 25, 1790. He studied at Leipzig and in 1753 became professor in the academy at Soröe, Denmark. In 1761 he was transferred to the gymnasium at Altona, where he became involved in a severe controversy with several theologians on account of his books raising questions against the orthodox faith. The foundation of the educational institution which became famous in history as the Philanthropinum was laid in 1774 at Dessau, Germany. The purpose of this institution was to supply a model school in which the principles of elementary work could be applied to practical methods. His system of education aims to secure the full development of all the faculties of the young. He thought that the pupil should learn with love, not with repugnance, and this theory had a beneficent influence upon the methods employed by other educational institutions. As an organizer he did not prove successful, but teachers from his institution were scattered through all parts of Germany and applied in various ways the principles of the founder. He published "Book of Methods," "Pedagogical Conversations," and "Address to the Philanthropists and Men of Property."

BASEL (bä'zẹl), or **Bâle,** a city and canton of Switzerland. The canton has an area of 177 square miles and a population of 82,390. It borders on Alsace and the inhabitants are German. The city of Basel is one of the largest in Switzerland, situated forty-three miles north of Berne, on both sides of the Rhine, and the two parts are connected by a number of bridges. It occupies a fine site about 800 feet above the level of the sea. The two parts into which it is divided by the river are known as Grossbasel and Kleinbasel. It is the seat of a cathedral founded in 1010, which contains the tombs of Erasmus and other distinguished persons. It has a fine university founded in 1459. The university library contains 232,000 volumes and many pamphlets. With it are affiliated an institute of natural sciences and the botanical gardens. Among the noted buildings are the museum, the Bible Institute, the city hall, and the Church of Saint Elizabeth. The manufactures include silk, ribbons, machinery, leather, paper, spirituous liquors, clothing, and aniline dyes. It has a large and growing commerce. A network of railroads connect it with other cities, and the Rhine furnishes water navigation. It is considered the wealthiest city of Switzerland. Gas and electric lights, street railways, waterworks, and excellent schools are among the modern improvements. Basel was a Roman military post in the 4th century, when it was known as Basilia. In the 10th century it became a free city, when it was ruled by its bishop and chief nobility, and it was joined to the Swiss Confederation in 1501. Population, 1920, 138,276.

BASEL, Council of, the last of the three great ecclesiastical councils convened in the 15th century, held at Basel, Switzerland, in 1431-49. The first of these councils was held at Pisa, Italy, in 1409, and the second at Constance, Switzerland, in 1414-18. The council of Basel was called by Pope Martin V., who died shortly after its convocation, and was succeeded by Eugenius IV. Its objects were to deliberate with the intention of extirpating heresies and to discontinue wars among Christian princes. However, the council got into disputes with the Pope, deposed him, and elected Felix V. in his stead. At the death of Eugenius IV., Nicholas V. succeeded to the pontificate, who brought about a reconciliation which resulted in the abdication of Felix V. and the official sanction of the decrees of the council of Basel. Final adjournment was agreed upon May 4, 1449.

BASE LINE, in surveying, a line measured with precision and used as the basis for government surveys, from which townships are numbered. Ranges are numbered east and west of prime meridians.

BASIL (băz'ĭl), a plant native to the warmer temperate parts of the Northern Hemisphere. It is an annual and has a fine odor. The leaves are long and the flowers appear in whorls of six. It is cultivated for seasoning and for its medicinal virtues. The *sweet basil* is native to the East Indies. It is grown extensively in Europe.

BASILIAN MANUSCRIPTS, the name of two valuable Greek manuscripts in the library at Basel, Switzerland. One is a copy of the whole new testament, except the Apocalypse, written in the characters of the 10th century. The other is in uncial characters, written at Constantinople in the 8th century, and contains the Gospels, except Luke iii, 4-15, and xxiv, 47-53.

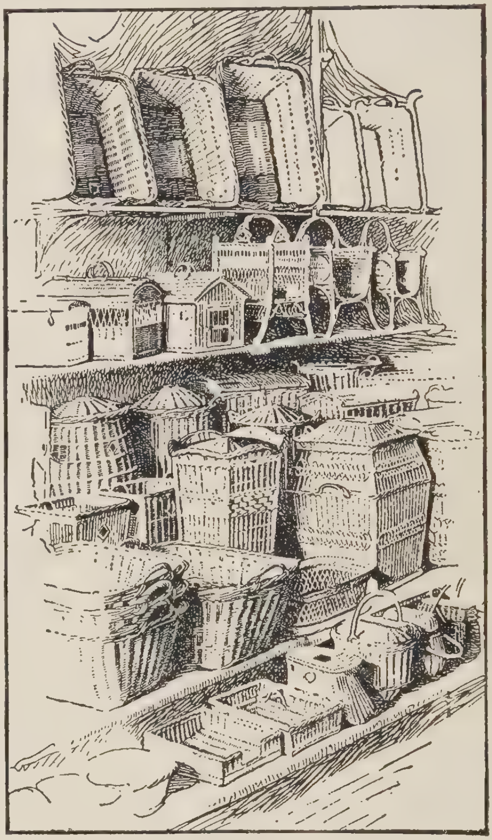
BASILICA (ba-zĭl'ĭ-kȧ), in architecture, a public hall or a courthouse. The term was used extensively among the ancient Greeks and Romans, and had reference to the public buildings in which princes and magistrates administered justice. The Basilica Portia, built about 182 B. C., is among the first mentioned in Roman history. Structures of this class were very numerous in Rome and the provincial towns, especially before the time of Constantine I., and subsequently they were converted into Christian churches. They were usually surrounded by a peristyle of columns, and at one end was a semicircular or square apse. The five great patriarchal churches in Rome are still called basilicas. The term is used more or less in speaking of cathedrals, among them the cathedral in Quebec, Canada.

BASILISK (băz'ĭ-lĭsk), in fable, a creature variously represented to resemble a serpent, lizard, and dragon, and reputed to possess a fatal breath. In modern zoölogy the name is applied to a small reptile with four feet, a long tail, and a broad, membranous hood at the back of the head. These animals inhabit tropical regions, especially Central and South America, where they live near or in the water. They swim and climb trees with ease. Some species attain a length of thirty inches. They are hunted for food in some parts of the West Indies.

BASIL THE GREAT (băz'ĭl), **Saint**, eminent theologian, born at Caesarea, Asia Minor, about 330; died Jan 1, 379. He was carefully educated at Constantinople and Athens, after which he traveled extensively in Syria and Egypt, where he visited the famous hermits. After returning to his native town, he retired for study and contemplation at Iris, in Pontus, where he gathered a number of followers and sympathizers. In his religious faith he was orthodox, an opponent of Arianism, and when he became a candidate for the bishopric of Caesarea he was opposed by a number of parties. However, he was elected and his eminently able service placed him foremost among the fathers of the church and entitles him to the distinction of being the founder of Eastern monasticism. His writings are beautified by a fine literary style. He did not recognize the claim to primacy of the Roman church. "The Liturgy of Saint Basil" contains his chief writings, but is not entirely his own work.

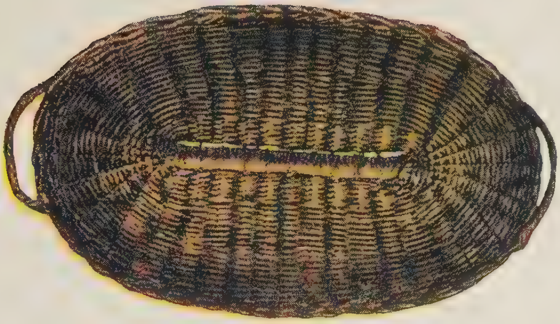
BASIN (bā'sin), in geography, a term used to describe a collection of water, as a river, sea, or bay. In physical geography the term is applied to the area drained by a river or a river system. The highest line between two basins is the *divide* or *watershed*. In geology it is used to designate a depression of a strata which has later become filled with deposits. Some geologists think geological basins were cut out by the action of glaciers.

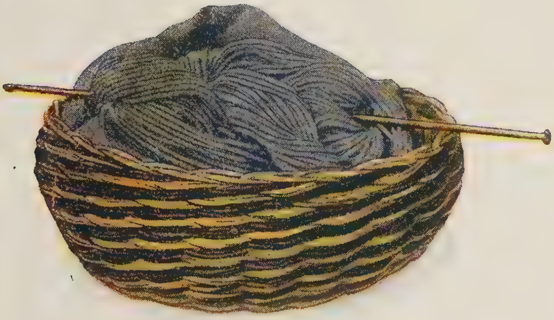
BASKET (bȧs'kĕt), a light, airy vessel used for domestic purposes. Baskets were made long before the Christian era, and remains of them have been found in the tombs of Egypt. In ancient times they were made water-tight by a coat of asphalt, and used as vessels to convey liquids. Now many kinds of splints and twigs are woven into baskets, but willow shoots are most commonly used for that purpose. They are prepared by soaking in water, and then peeled by tools and split. Some workmen make a rude product by using willow, ash, elm, and birch shoots without peeling them. Beautiful baskets are made with splints finely worked and nicely decorated with artistic colors. In France, Japan, and China large quantities of elegant baskets are made for the market. The Indians of North America still make very handsome baskets ornamented with beads and shells.

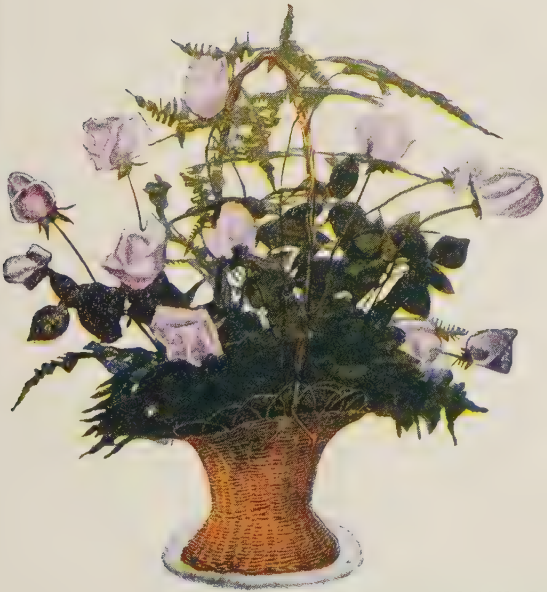


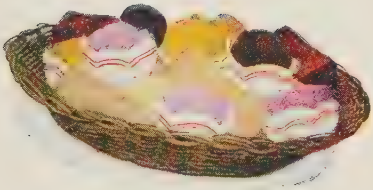
BASKETS.

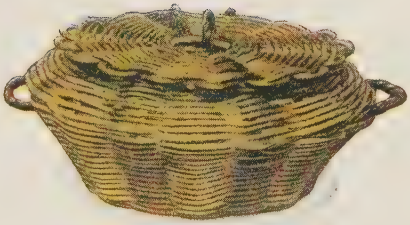
BASKET BALL, a popular game played indoors, with a ball thrown by hand into goals. The room in which the game is played is oblong, and the ground or floor contains about 3,500 square feet. At each end is a goal or basket, made by suspending nets of cord from metal rings. The goals are ten feet above the floor and eighteen inches in diameter, and the ball, made of inflated rubber bladder covered with a leather case, is round and from thirty to thirty-two inches in circumference. Two teams of five players each take part in the game, each side having a left and right guard, a center, and a left and a right forward. A referee, who has general supervision, puts the ball in play by throwing it into the center of the field somewhat higher than either of the

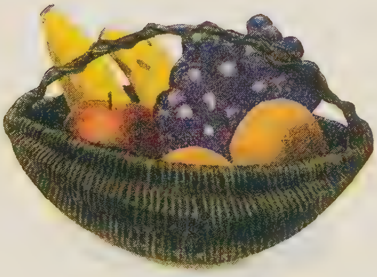


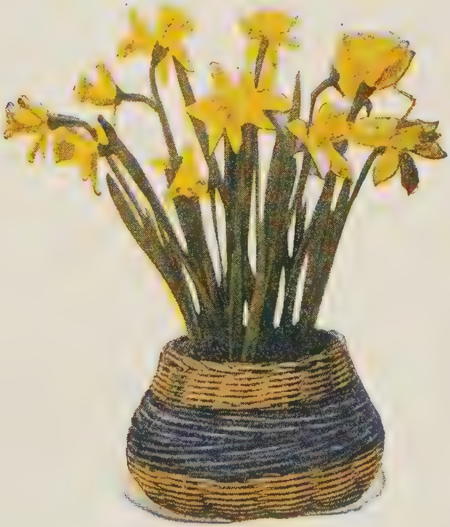












WOVEN AND BASKET WORK.

Table Mat.

Crochet Basket.

Cane Flower Basket.

Cake Basket.

Basket for Needle Work.

Willow Fruit Basket.

Cane Flower Basket.

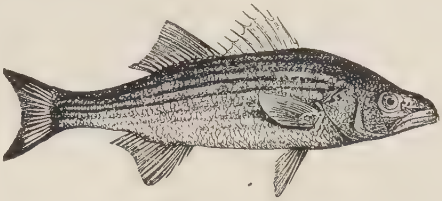
centers can jump, and at right angles from the side lines. As soon as the ball leaves the referee, each team makes an effort to throw the ball into the basket of the other, and to prevent the opposing side from making a similar goal. The ball cannot be kicked or carried, but must be thrown or batted with the hand. If a player pushes or kicks an opponent or is intentionally rough, the opposing team is permitted to have a throw free at a distance of not less than fifteen feet. A goal from the field counts two points, and a goal made by a free throw counts only one.

Basket ball was invented by James Naismith in 1891. It became popular soon after, and is played extensively by militia companies, by the Young Men's Christian Association, and in many of the schools and colleges. Official rules were drawn up by the Amateur Athletic Union to govern the practice. The game furnishes healthful exercise and calls into use the principal muscles of the body. It requires quickness of perception, attention to points of advantage as the game progresses, and rapidity of thought and action. Besides, it furnishes pastime in the winter season as well as at other times of the year, and is played when football and baseball are out of season.

BASQUES (bȧsks) a peculiar race of people which probably occupied the whole Iberian Peninsula at a remote date. At present the Basques are confined to the Spanish provinces of Biscay, Alava, Guipuzcoa, and Navarre, and the department of Basses-Pyrénées of France. The total number in Spain and France aggregates about 600,000. Their language, known as the Basque language, has no close affinity with any European tongue. They are considered descendants of the people of ancient Iberia. Their industries are chiefly agriculture, mining, and fishing. They are fond of music and celebrate their holiday, Sunday, in singing and dancing. The name *basque* is applied to a short waist worn by ladies, which was probably copied from the Basque costume.

BAS-RELIEF (bä-rē-lēf'), in sculpture, a kind of art work in which the figures project slightly from the background. In this style the height is about equal to half of the thickness of the figure, but in many sculptures of the 16th century the Italian artists had the figures project very slightly. The palaces of Assyria had bas-relief work set in alabaster, and in the halls were elaborate figures representing their deities and scenes of war and hunting. Bas-reliefs are common in Egyptian monuments, but the most famous examples are those which form the frieze of the Parthenon at Athens. Cavo-relievo are a kind of bas-reliefs in which the whole figure is set below the general surface, and the relief is in a sunken panel.

BASS (bȧs), a strong, active game fish. The name is applied to widely different fishes of the perch family. Among the common American varieties are the *rock bass,* the *black bass,* the *spotted bass,* and the *ruddy bass.* Different species of bass are found both in the sea and in fresh water. Most of them are good for food and make fine sport for anglers, while others are coarse. The usual weight is about two pounds, while the *striped bass,* an American species, attains a weight of thirty pounds.



STRIPED BASS.

BASSANO (bȧs-sä'nō), **Giacomo da Ponte,** painter, born in Bassano, Italy, in 1510; died in 1592. His father taught him the principles of painting, and he enjoyed opportunities in studying the designs of Titian and other masters. His productions consist largely of landscapes, flowers, portraits, and historical pieces. His son Francisco (1548-91), was a painter of considerable note.

BASSETERRE (bȧs-târ'), a city of the British West Indies, capital of the island of Saint Christopher, or Saint Kitts. It has a good harbor and a trade in sugar and fruit. The streets are improved and many of the building are modern and substantial. Population, 1923, 9,962.

BASSETERRE, a town of the West Indies, capital of the French island of Guadaloupe, at the mouth of a small river. The harbor is poor, but the town has considerable trade. It is the seat of a bishop and has some modern utilities. Population, 1922, 8,626.

BASSIA, the name of a genus of plants native to warm climates, including several species of trees valued for their fruit. The *Mahwa tree* of the East Indies is valuable for its timber, and oil is obtained from the seeds. A species yields the shea butter, which is an important article of commerce in the central part of Africa, and is considered quite palatable.

BASSORA (bȧs'sō-rȧ), or **Basra,** a commercial city of Asiatic Turkey, capital of a vilayet of the same name, on the Euphrates River. The surrounding country is fertile and produces rice, vegetables, and the date palm. Though poorly built and without modern facilities, the city has an important trade in coffee, drugs, rice, camels, and manufactured articles. A stone wall surrounds the city, and within are several monuments and mosques. It has a military station and is the seat of British and American consulates. Population, 40,000.

BASS STRAIT (bȧs), a channel north of Tasmania, which it separates from Australia.

It is 120 miles wide and is studded with many islands. Flinders Island is on its eastern extremity and Kings Island on its western. The strait was discovered in 1798 by George Bass, a surgeon in the British navy.

BASSWOOD. See **Linden.**

BASTIA (bȧs-tē′ȧ), a seaport and fortified city of Corsica, opposite the Isle of Elba, eighty miles northeast of Ajaccio. Many of the buildings are modern, but the streets are narrow and crooked, and the older part of the city has many small structures. Two harbors, the old and the new, are utilized in its commerce, which includes trade in oil, leather, macaroni, and marble. Dye, soap, and wax candles are manufactured. It was founded in 1380 by the Genoese. Population, 23,675.

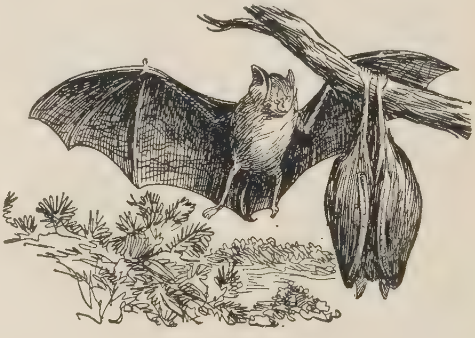
BASTIAT (bäs-tyȧ′), **Frederick**, economist, born in Bayonne, France, June 29, 1801; died in Rome, Italy, Dec. 24, 1850. He began extensive study of political economy in 1825, and became a strong advocate of the doctrine of free trade. Later he formed the acquaintance of Cobden and many free traders of England, whose speeches he translated into French. He delivered many addresses and wrote much against the protective system then in force in France, maintaining the view that it operated injuriously against the commercial welfare. His writings embrace "Harmonies of Political Economy," a work translated into several European languages.

BASTIEN-LEPAGE (bäs-tyän′ le-päzh′), **Jules,** painter, born at Damvillers, France, Nov. 1, 1848; died Dec. 10, 1884. He studied at Paris and Rome, and in 1874 made his first exhibit at the Salon. His "Portrait of My Grandfather," in which an elderly man is shown in a delicate outdoor light, was greatly admired. He painted portraits of Albert Wolff, Sarah Bernhardt, the Prince of Wales, and Gambetti on his deathbed. Other notable productions are "The Potato Harvest," "The Haymakers," "The Woodman," and "Joan of Arc, Listening to the Voices."

BASTILLE (bȧs-tēl′), a word formerly used in France to designate any strong castle defended by bastions, but now specially applied as the name of the prison and citadel of Paris built by Charles V. about 1370. This structure, though designed as a defense against the English, was used as a state prison for persons of rank who had lost standing in the government and had forfeited public confidence. It had a capacity for seventy or eighty persons, and during the reigns of Louis XIV. and Louis XV. was used most extensively. Those confined were rarely criminals, but rather people who had displeased the king and his associates. These included political offenders, scholars, advocates, and priests, who were often confined so long that they were entirely forgotten by the public. On July 14, 1789, it was captured by a Parisian mob, which signaled the beginning of the Revolution. The next day it was destroyed and not a vestige now remains. Its site is marked by a column in the Place de la Bastille. The *fall of the Bastille* is an important epoch in French history and marks the downfall of the old monarchy.

BASUTOLAND (bȧ-sōō′tō-lănd), a British possession in South Africa, northeast of Cape Colony. The area is 10,293 square miles. It is bounded by the Orange River Colony, Natal, and Cape Colony, and is drained largely by head streams of the Orange River. The region is well watered and has a fine growth of grasses and forests. The climate is healthful and well fitted for Europeans. Coal, iron, and copper are the chief minerals. Agriculture is the leading industry. The possession was annexed to Cape Colony in 1871, and placed under the authority of the crown in 1884. Its government is administered under the direction of a high commissioner for South Africa, through a resident commissioner; the legislative power of the former is exercised by proclamation. The colony has about 260 schools, at which 13,120 pupils receive instruction. Several highways have been constructed and communication has been established with other South African countries by telegraph and railway lines. The native Basutos are a superior race of South Africa and are somewhat advanced in the arts of civilization. Maseru, the capital, has a population of 1,350. In 1922 the total population was 415,500, of which number 895 were whites.

BAT (băt), an animal with wings composed largely of a thin, membranous skin, which is stretched from the fingers of the fore limbs and along the sides back to the hind limbs and tail. It moves about in the twilight and darkness and is the only mammal that can fly with facility. The bat is found in the temperate and warm regions, but attains its greatest size and is most numerous in the tropics. The bats of the temperate climate are mouselike in appearance, and, when stretched, their wings measure about sixteen inches. In the daytime they frequent caverns, hollow trees, crevices of



HANGING BAT.

ruins, and isolated lurking places, and at night come out to feed upon insects. During the entire winter season they sleep, except in warm climates. Many species sleep in daytime, hanging by their hind legs, head downward. Bats are more or less abundant in all countries, except in the extreme north and south. Some varieties are fruit-eating animals and live in orchards and vineyards, while others support themselves by sucking the blood of other mammals; this class is known as *vampire bats.* There are no less than 450 species of bats, but all are classed as mammiferous quadrupeds. They show great attachment for their young, often endeavoring to protect them in case of danger, even submitting to captivity rather than forsake them. The Australian *kalong* is the largest of the bats.

BATANGAS (bȧ-tän′gäs), a city of the Philippines, capital of a province of the same name, in Luzon, fifty-two miles south of Manila. It is a seaport city of considerable importance and has a good harbor on Batangas Bay, an inlet from the Pacific. Among the chief buildings are the public library, a convent, and a palace. It has a large export trade and telegraph connections with interior and continental points. The manufactures include cigars, earthenware, clothing, and utensils. Waterworks and electric lights have been installed. It was captured by the United States in 1899, in the war against the natives. Population, 1921, 37,400.

BATAVIA (bȧ-tā′vĭ-ȧ), a seaport city on the north coast of Java, capital of the Dutch East Indies, in the Province of Batavia. It is located on a large bay and is unhealthful, owing to its hot climate and low site. Europeans have improved the city by a system of drainage and by building the new part on a more elevated tract of land. The chief buildings include the post office, the Java Bank, the Exchange building, the museum, and several Javanese temples. Among the modern improvements are electric lights, waterworks, and electric street railways. It has a large export trade in sugar, rice, coffee, tea, oil, indigo, and hides, principally with Holland. It was founded in 1619 by the Dutch, who improved it by building canals and an extensive harbor. A large per cent. of the inhabitants are Chinese and Malays. Population, 1922, 116,887.

BATAVIA, county seat of Genesee County, New York, 36 miles east of Buffalo, on the Lehigh Valley, the Erie, and the New Central railways. It is surrounded by a productive agricultural country, and is the seat of manufacturing establishments producing implements, machinery, shoes, textiles, canned goods, and flour. The chief buildings include the public library, the county courthouse, and the State School for the Blind. A monument to William Morgan, noted for his connection with the anti-Masonic movement in 1826, stands in a public place. It has a growing trade in merchandise and is improved by numerous municipal facilities. The city was founded in 1800. Population, 1905, 10,080; in 1925, 15,628.

BATE (bāt), **William Brimage,** soldier and legislator, born near Castalian Springs, Tenn., Oct. 7, 1826; died March 10, 1905. He attended public schools and as a youth became clerk on a steamboat, and subsequently volunteered his services in the Mexican War, after which he practiced law and edited a newspaper at Gallatin, Tenn. His district elected him to the State Legislature, and he was for a time attorney general for the Nashville district. At the beginning of the Civil War he joined the Confederate army as private, attained to the rank of major general, and surrendered with the army of the Tennessee in 1865. Subsequent to the war he again practiced law, and served as Governor of Tennessee in 1882-86. He was elected United States Senator in 1887, and was reëlected in 1893, 1899, and 1905. Both as Governor and Senator he was influential, and as the latter served on a number of important committees.

BATEMAN (bāt′man), **Newton,** educator, born in Fairfield, N. J., July 27, 1822; died in 1897. He studied at Illinois College and at Lane Theological Seminary, and became a teacher in a private school at Saint Louis. In 1847 he was chosen professor at the Saint Charles College, Missouri, and four years later became principal of the public schools at Jacksonville, Ill. He was elected State superintendent of Illinois in 1858, in which position he served efficiently for ten years, and in 1875 became president of Knox College, Illinois.

BATES (bāts), **Arlo,** author, born at East Machias, Me., Dec. 16, 1850. He graduated at Bowdoin College in 1876, and became editor of the Boston *Sunday Courier.* In 1880 he was elected professor of English at the Massachusetts Institute of Technology. His "Told in the Gate" contains Oriental stories in verse. His chief works embrace "The Pagans," "A Poet and His Self," "The Philistines," "Love in a Cloud," "Berries of the Brier," "Sonnets in Shadow," "Under the Beech Tree," and "Talks on Writing English." He died Aug. 25, 1918.

BATES, Blanche, actress, born in Portland, Ore., in 1873. She developed an early inclination to become an actress, and made her first appearance at San Francisco in "This Picture and That." In 1898 she played successfully at Daly's Theater, New York, and was especially popular as *Mirtza* in "The Great Ruby." She played as *Cigarette* in "Under Two Flags," at the Garden Theater, New York, in 1901, and since made a number of successful tours and visited the leading cities of America.

BATES, Edward, statesman, born in Belmont, Va., Sept. 4, 1793; died in Saint Louis, Mo., March 25, 1869. He secured a public school education and practiced law in Missouri, where he became attorney general of the State.

He was a member of the State Legislature, and in 1860, when Lincoln was nominated for President, he received much support for that office in the convention. After the election of Lincoln, Bates was chosen attorney general, but resigned in 1864.

BATES, John Coalter, soldier, born in Saint Charles County, Missouri, Aug. 26, 1842; died Feb. 4, 1919. He studied in Saint Louis and joined the Union army at the beginning of the Civil War. In 1863 he was made a captain, served on the staff of General Meade from the Battle of Gettysburg until the war closed, and in 1892 was advanced to the rank of colonel. He served as brigadier general of volunteers in the Spanish-American War, and after the Battle of San Juan Hill was promoted to the rank of major general of volunteers. In 1899 he became military Governor of Cienfuegos, and subsequently served in the Philippines, where he negotiated a treaty with the Sultan of Sulu. He succeeded Gen. Chaffee as lieutenant general of the United States Army in 1906.

BATH (bȧth), a city of Somersetshire, England, on the Avon River. It is noted for its mineral water and baths. The mineral springs were known to the Romans, and remains of baths constructed by them in the 1st century B. C. have been discovered. The city is built largely of white stone obtained from quarries in the vicinity. Victoria Park, a beautiful public ground, contains fifty acres. The chief buildings are a public library, the theater, the Abbey Church, and the city hall. It is the seat of Bath College and Wesleyan College. It has important manufactures and a large railway and canal trade. Population, 1921, 50,729.

BATH, a city of Maine, county seat of Sagadahoc County, on the Kennebec River, about thirty-eight miles northeast of Portland. It is on the Maine Central Railroad and has extensive navigation facilities, as the water of the river rarely freezes. The manufactures include cigars, furniture, iron and leather wares, clothing, and machinery. It is surrounded by an agricultural country and has modern conveniences, including pavements and street railways. The first settlement was made in 1660, when an Indian mission was established. It was incorporated as a city in 1847. Population, 1900, 10,477; in 1920, 14,731.

BATH, a town in New York, county seat of Steuben County, 98 miles southeast of Buffalo, on the Erie and other railroads. It has manufactures of harness, shoes, and clothing. The surrounding country is agricultural. It is the seat of an orphan asylum and a soldiers' and sailor's home, and has a public library and several county buildings. The first settlement was made on the site of Bath in 1793. Population, 1905, 4,894; in 1920, 4,795.

BATHING (bāth'ĭng), the immersion of the body, or a part of it, in water for the purpose of maintaining cleanliness and stimulating health. It was a part of the religion of many ancient nations, including the Egyptians, Hebrews, and Greeks, to bathe the body. The Koran makes it mandatory on Mohammedans to wash the face, hands, and feet five times a day. This command is observed so carefully that when the Moslem is in a desert and out of the reach of water the ceremony is performed with sand. The Romans built the most splendid baths constructed by the ancients. In the time of Emperor Diocletian the Roman baths had a capacity sufficient for 18,000 persons to bathe at once, while Emperor Caracalla built baths nearly a quarter of a mile square. These structures were provided with washing rooms, courts for games, gymnasiums, hot and cold water baths, vapor baths, swimming baths, and hot-air baths, and their walls were decorated with marbles, statues, mosaics, and historic paintings.

Baths are variously designated from the character of the process to which the body is subjected. A *Turkish bath* is applied by admitting hot air into the room where the bather sits, and the heat of the air is constantly increased until he perspires freely, when he goes into a washroom, where his body is briskly scrubbed with water and soap and cooled by a shower bath. He next plunges into a swimming bath of cool water, where he bathes freely, and, after emerging, he is dried, wrapped in a blanket, and lies down on a lounge until the natural warmth of the body returns. A *Russian bath* differs from the Turkish in that the hot air is displaced by hot steam, but in other respects they are similar.

A hot bath brings the blood near the surface, which reddens the skin, the veins become enlarged, and a heaviness is felt in the head. The effect of violent heat is to fatigue the body, hence warm baths should be carefully administered. The better way is to take lukewarm baths and increase the heat from time to time as the body becomes accustomed to it. A warm bath gives no shock to the bather and is always pleasant. It has a tendency to quiet the nerves and increase the flow of blood, and is the best form for most persons. A cold bath causes a sudden chill, and is followed by a feeling of warmth, which is called a *reaction*. The bather should remain in water only until he feels the reaction, when he should come out and rub himself dry with a coarse towel. None but the strong are able to endure a cold bath, and this administered carefully is of much utility. *Sea bathing* is one of the most pleasant and beneficial exercises for the body. The salt water seems to have a wholesome effect upon the skin and is quickening to the organs, if the bather does not remain too long in the water.

Baths are usually known by the degree of temperature at which the water or vapor is administered. The average temperature of a cold bath is about 48° Fahr.; cool bath, 58°;

tepid bath, 88°; warm bath, 95°; and hot bath, 100°. In many cities mineral water flowing from the ground is utilized for bathing purposes. Some of the most noted mineral baths in Europe are at Baden, Karlsbad, and Aachen, Germany; Spa, Belgium; and Teplitz, Bohemia. The leading natural hot baths of North America are at Hot Springs, Ark., and Hot Springs, S. D. The water is both mineral and thermal, ranging in temperature from 100° to 160°. Thousands of people patronize these health resorts, and indulge in bathing both for pastime and to regain lost health. Many physical ailments can be cured and the system can be greatly strengthened by the use of these natural remedies. In recent years it has become quite general to construct water systems, by which dwelling houses having bath tubs are supplied with water. In this way every member of the family can avail himself of a healthful bath without inconvenience, and have it administered at the proper time. Though bathing is generally healthful, a person should not remain too long in the water, and bathing within three hours after a meal should be carefully avoided.

BATH, Knights of the, a military order in Great Britain, the largest in number and the highest to which a commoner can attain. It was so named from the ceremony of bathing, which was formerly practiced when a knight was initiated, hence indicated that both purity and chivalry were required. The order probably dates from the early part of the 12th century, and it is thought that it was instituted by Henry I., who is said to have made Geoffrey of Anjou and others "Knights of the Bath." It was used in the coronation of Charles II., in 1660, and later fell into disuse, but was revived by George I. in 1725. At present it comprises three classes, Knights Grand Cross (G. C. B.), Knights Commander (K. C. B.), and Companions (C. B.).

BATHOMETER (bȧ-thŏm'ê-tẽr), an instrument to indicate the depth of water. It was invented by C. W. Siemens and is used on vessels, indicating the depth of the water below the ship or steamer. The instruments belonging to this class differ materially, ranging from the simpler forms used to measure shallows to the more complicated apparatus necessary to determine great depths. In general they depend upon the principle that underlies the law of gravitation, and that the attraction exerted by the land is stronger than that of water. The essential part is a vertical steel tube, at the lower end of which is a cup-shaped expansion, and the depth of the water is indicated on a micrometer scale as the mercury rises or falls in the tube. In some instruments oil or water is used instead of mercury. The column in the tube lowers in shallow water, since greater force is exerted in drawing down the mercury, and it rises in deeper water to the extent that the force is diminished. A sounding line is used to sink the instrument to the bottom.

BATON ROUGE (băt'ŭn-ro͞ozh), the parish seat of East Baton Rouge parish, and capital of Louisiana, on the east side of the Mississippi River, about ninety miles by railroad and 130 by river from New Orleans. It is on the Missouri Pacific and the Yazoo and Mississippi Valley railroads, and occupies a prominence about twenty-five feet above high-water mark. The city is the seat of the State University, an asylum for the deaf and dumb, a military hospital, an agricultural experiment station, and a State penitentiary. Among the prominent buildings are the State capitol, the courthouse, the post office, the high school, and the city hall. It has manufactures of sugar, ice, clothing, cotton products, and machinery. Electric street railways, waterworks, and paved streets are among the improvements. It was founded by the French and was the capital from 1847 to 1864, when the seat of the State government was removed to New Orleans, but it was again made the State capital in 1880. The Union army occupied it in the Civil War, after New Orleans had been taken, and it suffered a Confederate attack under General Breckinridge, but was held by the Union army under General Williams, who was slain in battle. Population, 1900, 11,269; in 1920, 21,782.

BATTALION (băt-tăl'yŭn), the tactical unit of infantry. It constitutes the most numerous body of unmounted men in charge of one commanding officer who gives personal superintendence. It is made up of from four to ten companies, has a normal war strength of 1,000 men, and is commanded by a field officer. A regiment is constituted of two or more battalions; a brigade, of two or more regiments; a division, of two or more brigades; an army corps, of two or more divisions, and an army, of two or more army corps. See **Army.**

BATTERING-RAM (băt'tẽr-ĭng-răm), an ancient war machine to batter down walls of forts and cities. It consisted of a great wooden beam with a heavy bronze or iron head. The length was from 50 to 180 feet, and the head of large rams weighed a ton. Many were built in frames, while others were on rollers or wheels with a cover over the front to protect the workers from falling missiles. The work of the ram was effected by about one hundred men, or by the use of ropes and pulleys. It was regarded an essential implement in the time of the ancient Greeks and Romans, who employed it extensively while laying siege to fortified cities.

BATTERY (băt'tẽr-ȳ), the tactical unit of artillery. The term is applied to the largest number of mobile guns, with full equipments, that one man can personally superintend. They are usually distinguished as horse, field, and garrison. The first two consist of six guns each, Along with each battery are gunners to work the guns. Each battery includes a number of persons who manage the horses or motor vehicle by which the guns are transported from one locality to another. See **Artillery.**

BATTLE (băt't'l), a combat between two or more armies, or divisions of armies. Battles are fought either with the view of attaining local advantage, or influencing favorably the whole contest. The skillful commander aims to reach a decisive point in each engagement. This is *strategy,* while skill in active battle is called *tactics.* Each victory must be followed up in order to fully disable the beaten army and thereby gain the advantage of success. Battles do not depend upon their magnitude for importance, but rather upon their enduring effect upon social and political conditions. In Creasy's "Fifteen Decisive Battles of the World, from Marathon to Waterloo," a list of the battles is given that have largely influenced history and made civilization, more or less, what it is. The mind fills with awe when contemplating what human institutions might have been had these battles terminated differently. The following is a complete list as given by Creasy:

B. C.
490. Battle of Marathon.
413. Defeat of the Athenians at Syracuse.
331. Battle of Arbela.
207. Battle of the Metaurus.
A. D.
9. Defeat of the Romans under Varus.
451. Battle of Chalons.
732. Battle of Tours.
1066. Battle of Hastings.
1429. Joan of Arc's victory at Orleans.
1588. Defeat of the Spanish Armada.
1704. Battle of Blenheim.
1709. Battle of Pultowa.
1777. Defeat of Burgoyne at Saratoga.
1792. Battle of Valmy.
1815. Battle of Waterloo.

BATTLE CREEK (-krēk), a city of Michigan, in Calhoun County, on the Kalamazoo River and on the Grand Trunk and the Michigan Central railroads, 45 miles southwest of Lansing. The chief buildings are the post office, the high school, the public library, and the Post Theater. It has manufactures of threshing machines, knit goods, flour, furniture, hardware, cereal foods, machinery, and farming implements. Battle Creek College was founded here by the Seventh Day Adventists, in 1874, and later they established a sanitarium, which is attracting a large patronage. Health foods are made on a large scale at the sanitarium. The city has fine municipal facilities, and is noted as an educational and commercial center. It was incorporated as a city in 1860. Population, 1904, 22,213; in 1920, 36,164.

BATTLEFORD (băt't'l-fôrd), a town in Saskatchewan, at the junction of the Battle and North Saskatchewan rivers, near the line of the Canadian National Railway. It was the capital of the Northwest Territory from 1876 to 1883, and near it was organized the insurrection headed by Louis Riel. The surrounding country is devoted to farming and ranching. Population, 1921, 1,500.

BAUDRY (bō-drȧ'), **Paul Jacques Aimé,** painter, born at La Roche-sur-Yon, France, Nov. 7, 1828; died Jan. 17, 1886. He studied under Drölling in Paris and was awarded the Grand Prize in 1850. Subsequently he studied in Rome, where he was inspired by the works of great masters, and in 1875 became commander in the Legion of Honor. His decorations in the opera house in Paris are especially esteemed, and his "The Glorification of the Law" is considered a masterpiece of art. He painted works entitled "Toilet of Venus," "Fortune and the Child," and "Saint John the Baptist."

BAUMGARTEN (boum'gär-ten), **Alexander Gottlieb,** philosopher, born in Berlin, Germany, July 17, 1714; died May 26, 1762. He studied at Halle and in 1740 became professor of philosophy at Frankfort-on-the-Oder. His works on aesthetics are considered authoritative, and he is regarded by some writers as the founder of the theory of modern aesthetics. His chief works are "Aesthetical Philosophy," "Metaphysics," and "General Philosophy."

BAUR (bour), **Ferdinand Christian von,** theologian, born near Stuttgart, Germany, June 21, 1792; died Dec. 2, 1860. He graduated from the University of Tübingen in 1817 and the same year became professor in the seminary at Blaubeuren, and after doing successful work nine years was called to the chair of Protestant theology in the University of Tübingen. His life was consecrated to the study of religion, and he made a specialty of investigating the symbolism of the church and the history of doctrines, showing a great fertility of mind and a broad knowledge of biblical exegesis. From the standpoint of activity and powerful thought, he may be considered the most speculative theologian of Germany since Schleiermacher. In 1835 he published "Christian Gnosis, or the Christian Philosophy of Religion," which is regarded his most important work. Other publications that made a deep impression on religious thought include "Points of Difference Between Catholicism and Protestantism," "The So-called Pastoral Letters of the Apostle Paul," "Critical Examination of the Canonical Evangelists, Their Source and Character," "Church History of the First Three Centuries," "Paul, the Apostle of Jesus Christ," and "Christian Doctrine of the Trinity, and Union of God and Man."

BAUTZEN (bou'tsen), a city of Germany, in the kingdom of Saxony, on the Spree River, thirty miles northeast of Dresden. It has railroad and electric railway facilities and manufactures of leather, textiles, and clothing. A cathedral, a castle, and the royal palace are among the chief buildings. It became a town in the 10th century, in the reign of Otho I., and suffered greatly during the Thirty Years' War. In 1813 it was the scene of a great battle between Napoleon, with an army of 130,000 men, and an allied army of 90,000 Germans and Russians. Napoleon had made the attack and after a contest of two days retreated, having lost about 20,000 men. Population, 1920, 32,760.

BAVARIA (bȧ-vā'rĭ-ȧ), formerly a kingdom, now a state of Germany, next to Prussia the largest state of the German Republic. It consists of two separate portions, the eastern and larger part, or Bavaria proper, and the western, or Rhenish Bavaria. Eastern Bavaria is surrounded by Austria-Hungary, the Thuringian states, Hesse-Nassau, Saxony, Württemberg, Baden, and Hesse. Rhenish Bavaria, or Palatinate, is bounded by Prussia, Alsace-Lorraine, Hesse, and Baden. The area is 29,282 square miles.

PHYSICAL FEATURES. The surface is more or less mountainous and most of the boundaries are formed by mountain ranges. In Southern Bavaria are three ranges of the Alps, known locally as the Algäuer Alps, the Salzburger Alps, and the Bavarian Alps. Of the last mentioned the Zug Spitze, 9,725 feet, is the highest peak. The Böhmerwald is in the northeast, and in the north are the Rhöngebirge and the Fichtelgebirge. An elevated plain stretches through the interior of Bavaria, and in the Palatinate are the Harz Mountains, whose peaks reach an elevation of 2,500 feet above the sea. Most of the drainage is by the Danube and its tributaries. These tributaries include the Altmühl, Regen, Vils, and Wörnitz from the north, and the Lech, Inn, Iller, and Isar from the south. The Main River drains the northwestern part. Amersee and Chiemsee are among the lakes in the southern part. The rainfall is greatest in the eastern part of Bavaria, about seventy-five inches, and in the Palatinate and the higher altitudes it averages twenty-four inches annually.

NATURAL RESOURCES. Nearly one-third of the kingdom consists of forests, which yield large returns from the sale of timber. The minerals are valuable, especially coal and iron, and there are deposits of salt, graphite, and building stone. The soil is noted for its fertility.

INDUSTRIES. Agriculture is the most important enterprise, and is developed to a higher state of perfection than in most of the European countries. Associations and institutes for the purpose of teaching farming are maintained, and the matter of storing seed, selecting choice grades of domestic animals, and harvesting cereals and forage are carried on through coöperative associations. Hay, rye, and oats take the highest rank in the quantity produced. Other products embrace barley, wheat, potatoes, sugar beets, hops, and rape seed. Stock raising is conducted with much care, and the cattle and horses of Bavaria are among the best seen on the European market. The vine-growing industry receives marked attention, especially in the Palatinate.

Manufacturing as an enterprise has developed to a great extent the last two decades, especially in the output of steel and iron. In the manufacture of beer the kingdom takes high rank and its production of spirituous liquors is a notably important enterprise. The manufacture of textiles, leather, tobacco, earthenware, chemicals, and agricultural implements is developed to a considerable extent. Navigation by water is furnished by the Main and Danube rivers and by Lake Constance. The Ludwigs Canal serves as a connecting link between the Black and North seas, since it connects the Main, a tributary of the Rhine, with the Altmühl, a tributary of the Danube. Transportation by steam railways and electric lines is well provided for in the cities and all parts of the state.

GOVERNMENT. For the purpose of government Bavaria is divided into seven districts. These are Upper Bavaria, Lower Bavaria, Swabia, Upper Palatinate, Lower Franconia, Middle Franconia, Upper Franconia, and Palatinate. The government of the state is a constitutional republic, of which the president is the chief executive, and the right of suffrage is in both sexes. Six ministers constitute a council of state and assist the president. The legislative power is vested in the elective parliament, or *landtag*, which consists of the two houses known as the chamber of councilers of the realm, or upper house, and the chamber of deputies, or the lower house. In the former are eighty members and in the lower 159. Bavaria is represented in the *Bundesrat* of the German Empire by six members and in the *Reichstag* by forty-eight. The state provides amply for education, which is free and compulsory. Three famous universities are located at Würzburg, Munich, and Erlangen.

INHABITANTS. The inhabitants are almost exclusively German, including only about 50,000 Jews. About thirty-three per cent. are Protestants and more than half of the entire population are Roman Catholics. Munich, the capital, is located on the Isar River. Augsburg, Nuremberg, Ratisbon, Bamberg, Erlangen, Baireuth, and Schweinfurt are the principal commercial centers. In 1905 the state had a population of 6,176,057; in 1925, 7,379,594.

HISTORY. In ancient times the territory comprised in Bavaria was inhabited by Celtic tribes, known as the Boii, and the region was conquered by the Romans about the year 15 B. C. It became a possession of the Franks in the time of Charlemagne in the 8th century, and in 1070 was acquired by the Guelph family. The territory was transferred to Otho, Count of Wittlesbach, in the latter part of the 12th century, and its government has been administered by this family almost without intermission to the present time. Napoleon raised Bavaria to the dignity of a kingdom in 1805, and the king aided France in the Napoleonic wars. The present constitution was adopted in 1818. In 1866 Bavaria sided with Austria in the Austro-Prussian War and lost some territory annexed to it by Napoleon. When Napoleon III. declared war against Germany in 1870, Bavaria joined Prussia and took a prominent part in the military movements against France. It was largely at the suggestion of the King of Bavaria that William of Prussia accepted the title of Emperor of Germany. It has since remained important as an integral part of the country, influential in its councils, and a leader in promoting the commercial and colonial development of Germany.

BAXTER (băks'tẽr), **Richard,** eminent divine of the 17th century, born at Rowton, England, Nov. 12, 1615; died in London, Dec. 8, 1691. He became chaplain in the Civil War of 1642, siding with the Parliament. His eloquence was brought in play against the execution of the king and in opposition to the election of Cromwell, and later he made a reputation as a powerful minister and an able writer. Among his most popular productions are "Call to the Unconverted," "Saint's Everlasting Rest," "Reformed Pastor," "Christian Directory," and "Catholic Theology." A statue was erected to his honor at Kidderminster in 1875.

BAY (bā), or **Bay Tree,** the general name of several trees and shrubs which resemble the laurel, and applied both to the fruit and the trees. The red bay is native to the southern part of the United States and has wood colored much like mahogany. Bay laurel is a term sometimes applied to the common laurel or cherry laurel. The bay tree of California is a fine species, and rose bay is the name sometimes given to species of the azaleas and rhododendrons. Some trees belonging to this class have berries that yield a fatty oil used in veterinary medicines. The leaves are sometimes used in cookery for the flavor, and in England and some other countries as decorations for Christmas. In ancient times sprigs of the bay tree were worn as a signal of victory.

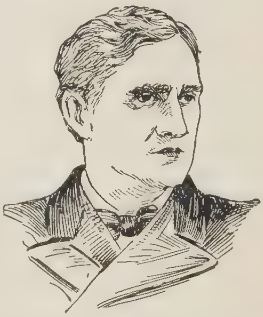
BAYA (bä'yȧ), a kind of weaver bird common in the East Indies. The color is yellow mixed with brown, and the beak is large and conical. Its nests are built in the form of a flask, suspended from a high branch, and the entrance is from below. The male and female birds have separate chambers. It is easily trained to obey and is fond of small articles of ornament.

BAYAMO (bȧ-yä'mȯ), a town of Cuba, in the province of Santiago, sixty miles northwest of the city of Santiago. It is surrounded by an agricultural country. The Spaniards founded it in 1514. At the time of the Spanish occupation it was prominent as a stronghold of insurgents and revolutionists. Population, 1920, 4,114.

BAYARD (bī'ẽrd), **James Asheton,** public man, born in Philadelphia, Pa., July 28, 1767; died Aug. 6, 1819. He took up the practice of law in Delaware and was elected to Congress from that State as a Federalist in 1796. His eminence as an orator in the House was a factor that influenced his election to the Senate, and he served in that body from 1804 until 1813. President Madison appointed him one of the commissioners to negotiate with Great Britain the Treaty of Ghent in 1814, serving in this capacity with Albert Gallatin and John Quincy Adams.

BAYARD (bā'a̤rd), **Pierre du Terrail, Chevalier de,** known as "the knight without fear and above reproach," born at Bayard, France, in 1475; killed in battle at Sesia, Italy, April 30, 1524. He distinguished himself in an expedition under Charles VIII. against Naples, and in the decisive successes over the Spaniards and English. Later he gained a victory for Francis I. at Marignano, in 1515, and successfully defended Mezieres against the attacks of Charles V. These successes caused him to be called the "Savior of his country." In 1523 he accompanied Admiral Bonnivet into Italy, where he was killed while guarding the passage of Sesia.

BAYARD, Thomas Francis, statesman, born in Wilmington, Del., Oct. 29, 1828; died near Dedham, Mass., Sept. 28, 1898. He descended from Peter Bayard, son of a French Huguenot, whose widow and three sons came to America in 1647. In 1851 he was admitted to the bar, served as United States district attorney of Delaware, and represented his State in the Senate from 1869 to 1885, being elected president pro tem. in 1881. President Cleveland chose him for Secretary of State in 1885, and in 1893 appointed him the first ambassador to the Court of Saint James, London. In this capacity he aided in settling the boundary dispute between British Guiana and Venezuela, and stimulated cordial feelings between the United States and England. Oxford honored him with a doctorate of law. He ranks among the foremost statesmen of America, and is classed as an able speaker and scholar.



THOMAS FRANCIS BAYARD.

BAY CITY, county seat of Bay County, Michigan, on the Saginaw River, seventy-five miles northeast of Lansing. It occupies a fine site about four miles from Saginaw Bay, and is on the Peré Marquette, the Michigan Central, and other railroads. The county courthouse, the post office, the city hall, the Masonic Temple, and the First Presbyterian Church are among the chief buildings. It has city waterworks, fine public schools, and a large library. The manufactures include furniture, salt, earthenware, machinery, hardware, clothing, and tobacco products. The city is one of the most prosperous in the State, situated in a fine farming and dairying country, and has a large jobbing trade. Its streets are well paved and lighted. It was settled in 1836 and incorporated in 1865. West Bay City, across the river, was annexed in 1905. Population, 1920, 47,554.

BAYEUX (bȧ-yẽ′), a city of France, in the department of Calvados, Normandy, twenty miles northwest of Caen. It is nicely situated on the Aure River, five miles above its outlet into the English Channel, and has a trade in cattle, grain, and dairy products. The chief building is a cathedral said to be the oldest in Normandy. It occupies the site of the Roman town known as Augustodurum. Population, 1922, 7,315.

BAYEUX CATHEDRAL, the oldest cathedral in Normandy, located at Bayeux, France. Most of the present buildings date from the 11th to the 13th centuries. Many notable improvements were made in 1077 by William the Conqueror, and various additions have been added since. To the west are two steeples and several beautiful sculptured porches built in the 12th century.

BAYEUX TAPESTRY, a linen cloth twenty inches wide and 214 feet long, on which scenes of the invasion and conquest of England by the Normans were skillfully worked. It is said to be the work of Matilda, the wife of William the Conqueror. The scenes begin with Harold's visit to the Norman court and end with the defeat of the English and the death of Harold at Hastings. It is divided into seventy-two compartments, and on each one the subject of the scene is indicated in Latin inscription. It was discovered in 1730, and is now kept in the library of Bayeux, France, as a valuable record of scenes and customs in the early period of Norman-French history.

BAYONET (bā′ō-nĕt), a short weapon of steel, constructed something like a dagger, and attached to the end of a musket or rifle. It was so named from the circumstance that the bayonet was first used at Bayonne, France, and it came into general use about the middle of the 17th century. The first bayonets were carried by the soldiers, and when used to repel a cavalry charge, or when making an advance upon the enemy, they were thrust into the muzzle of the gun. Later they were fastened on the outside so as to permit both the use of the bayonet and the gun for firing upon the enemy. With the introduction of modern firearms the bayonet lost some of its importance as a weapon, but many military men still regard it highly serviceable in making a charge, especially when culminating an infantry attack.

BAYONNE (bā-yōn′), a city of New Jersey, in Hudson County, situated immediately southwest of Jersey City, from which it is separated by the Morris Canal. The site is adjacent to New York and Newark bays, on the New Jersey Central Railroad, and within it are included the villages of Bergen Point, Salterville, Bayonne, and Centerville. It has dock facilities, electric street railways, waterworks, pavements, public lighting, and numerous schools. The manufactures embrace lumber products, chemicals, machinery, textiles, and clothing. Many New York business men reside in Bayonne. It was chartered as a city in 1869. Population, 1905, 42,262; in 1920, 76,754.

BAYONNE, a city of France, in the department of Basses-Pyrénées, on the Adour River, near the Bay of Biscay. It is well built and strongly fortified. It has a commodious harbor, in which three lighthouses are maintained, and its export and import trade is considerable. Sugar refineries and shipyards are among the industries. A cathedral built in the 13th century is its chief building, and it is the seat of a naval school and a public library of 12,000 volumes. Charles IV. of Spain renounced the crown at Bayonne in 1808. Anciently it was called Lapurdum. Population, 27,500.

BAYREUTH. See **Baireuth.**

BAY RUM, a liquid used for toilet purposes and as a liniment in treating rheumatism. It is obtained by distilling with rum the leaves of the bayberry tree (*Myrcia acris*), which is native to the West Indies.

BAZAAR (bȧ-zär′), or **Bazar,** an exchange or market place where goods are kept for sale. The term is in common use in Eurasia, especially in the East, where a number of shops, either open or covered, are grouped about a square or in a series along the streets. Retail traders occupy the bazaars and offer for sale a variety of small articles, such as shawls, jewelry, household utensils, and wearing apparel. The term is applied in America to places where fancy work and other articles are sold to raise money for the support of an enterprise or for charity.

BAZAINE (bä-zān′), **François Achille,** general and senator, born at Versailles, France, Feb. 13, 1811; died in Madrid, Spain, Sept. 23, 1888. He became a soldier in 1831, and served with distinction in Algeria and Morocco, in Spain against the Carlists, and in the Crimea and Italy. When the French invaded Mexico, he was made commander in chief of the imperial army. In the Franco-German War of 1870-71 he was field marshal, and after the great battles of Mars-la-Tour and Gravelotte, he was besieged at Metz, where he was forced to surrender on Oct. 27, 1870, with an army of 170,000 men. His surrender was generally condemned, and he was tried by court-martial and sentenced to death, which President MacMahon commuted to imprisonment for twenty years. He escaped from Isle Sainte Marguerite, where he was imprisoned, and met the French empress and prince imperial in Switzerland. Later he traveled in England and Portugal, and spent the remainder of his life in Spain. He is the author of a number of military works.

BEACH, Charles Fiske, lawyer, born in Kentucky, Feb. 4, 1854. He attended school in Paris, Ky., and afterward studied at the Columbia University. In 1881 he was admitted to the bar and practiced law in New York City until 1885, when he began to practice as an American counsel in Paris, France. He published "Modern Equity Jurisprudence," "The Law of Receivers," "Modern Equity Practice," and "Contributory Negligence."

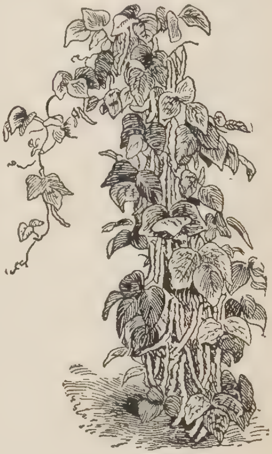
BEACON CITY New York. See **Matteawan.**

BEACONSFIELD (bē'kŭnz-fēld), **Benjamin Disraeli, Earl of,** eminent statesman of Jewish extraction, born in London, England, Dec. 21, 1804; died there April 19, 1881. He was elected to the House of Commons in 1837 as a Tory, and was reëlected in 1847 from Buckinghamshire, which seat he held thirty years, when he was raised to the peerage. In 1858 he became chancellor of the exchequer, and in 1868 premier. He introduced a bill to reform the civil service and the church in Ireland, which caused his defeat, but he again became prime minister in 1874, and held the position six years. He was of a literary turn of mind and wrote a number of romances. These include "Young Duke," "Endymion," "Lothaire," and "Coningby." In 1873 he was made lord rector of Glasgow University.

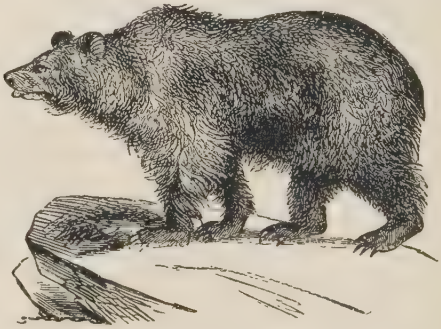
BEAD (bēd), or **Bede,** a small globular or cylindrical body, thirty or forty of which are strung together and worn for ornament or used for decoration. The name is from the Anglo-Saxon word *beade,* or *bede,* signifying a prayer. The Roman Catholics string beads together, to the number of thirty or forty, to keep count of prayers offered. In this form they constitute a *rosary.* Every tenth one is larger than the rest, called a *gaude.* The gaudes are used for counting paternosters, and the ordinary beads for Ave Marias.

BEAM (bēm), in architecture, a piece of timber or other material placed across the walls of a building and which serves to support the rafters. It binds together the parts of the frame as a tie and supports weight. Wood was employed chiefly in architecture as beams until in more recent times iron and steel came into very extensive use, and in some cases beams are now made of cement.

The word *beam* is applied in different ways and has several technical uses. A plow beam is the main piece, either of wood or steel, and to it the colter, plowshare, and moldboard are fixed. The main cross timber in a ship is called a beam, and serves to support the deck and prevent the sides from falling apart. The beams used in large steamboats are of iron, extend across the hull, and are supported near the middle by pillars. In a balance the beam is the part from which the scales are suspended, and the term is applied to a part of a weaver's apparatus, usually a wooden cylinder, on which the web is wound.


CLIMBING BEAN.

BEAN (bēn), an agricultural product grown for food in early history in Egypt and Palestine, and now largely cultivated in gardens and fields as food for man and beast. It is an annual, from two to twelve feet high. The seeds, usually from four to ten, grow in pods about ten inches long. They are kidney-shaped and measure from one-sixth of an inch to over an inch in length. Beans are nutritious food, containing twenty-three per cent. of nitrogenous matter, similar to casein in cheese, and thirty-six per cent of starch. There are many varieties, colors, and sizes. The so-called *kidney* bean is grown extensively in the gardens of Canada and the United States. Other popular species include the *lima* bean, which is quite large and is harvested for cooking before it is ripe, and the *string* bean, a variety with fleshy pods. Beans produce from fifteen to fifty bushels to the acre, a bushel weighing sixty pounds.


GRIZZLY BEAR.

BEAR (bâr), the name of an animal common to both the warm and cold climates. Numerous species are found in America and Eurasia, but they do not occur in Australia and Africa. They belong to the carnivorous or flesh-eating animals, but show considerable fondness for honey and some kinds of vegetables, and several species live largely on fruits.

in cold climates they attain a larger size and greater strength than in the warmer regions, and are much more savage. The body is stout and muscular, with strong legs, a short tail, and long shaggy fur, and the feet are supplied with strong claws well adapted for climbing and digging. They delight to roam in mountain districts and on the seaside, and are skilled as swimmers. The winter season is spent largely by sleeping in caves, especially by the females, which rear their young in the winter.

Among the many species is the *grizzly bear* of North America, which is found largely in the region of the Rocky Mountains. It is the most ferocious animal of North America and attains a large size, sometimes a length of nine feet, measuring from the nose to the tail, which is very short. It is colored brown, white, and black, and possesses grizzly or shaggy hair. The *black bear* has its home in all the uninhabited parts of North America. It is much smaller than the grizzly bear, about five feet long, has smooth, glossy, black fur, and lives largely on vegetable food, but in case of hunger will attack and carry off small animals like calves and hogs. It delights to climb trees and rob wild bees of their honey. Its character and habits are similar to those of the *brown bear* of Europe, which is solitary and subsists on animal and vegetable foods. The *cinnamon bear* has a color much like cinnamon and resembles the black bear in its habits. The *polar bear* inhabits the northern portions of America and Eurasia. This species is white and of large size, some species being as large as a horse and weighing 1,400 pounds. It hibernates in the winter season, usually in a deep hole dug in the snow or hillside. It lives near the sea or lakes, since it depends upon sea birds, seals, and fish for its principal food. In Southern Asia the *Malayan bear* is found. It is the smallest of the bears and lives exclusively on insects and vegetables and vegetable fruits.

The bear is a cunning animal, both in obtaining its food and in its habits when trained. In a wild state it often watches other animals from behind shelter, such as a rock or a tree, where it carefully studies their habits, and employs ingenious devices whereby it may make a capture. Under training the bear becomes skilled in many arts of amusement and exhibition. It can be taught to carry a gun like a soldier, to dance to music, to beat a drum, and to perform various capers, and, therefore, is employed to a considerable extent in shows and exhibitions of trained wild animals. The clumsy motions, grave manners, and solemn face make its actions interesting. However, it loses none of its cunning in captivity, and has learned to secure rare bits of food from manager and spectators as compensation for exhibiting its best skill.

The bear is hunted for its fur and flesh. Rugs, robes, and overcoats are made of the fur, which has become very expensive within recent years. The flesh is eaten and the fat is used in making bear's grease. Ornaments are made of the teeth and claws.

BEAR, Great and Little, known in astronomy as *Ursa Major* and *Ursa Minor,* two constellations in the northern sky near the north star. Ursa Major contains 138 stars visible to the naked eye. Among them are seven stars—six of the second and one of the fourth magnitude—which form the *Great Dipper.* Ursa Minor contains twenty-four stars, seven of which constitute the *Little Dipper,* and at its handle is *Polaris,* known from time immemorial as the North Polar Star. The latter was called *Cynosure* by the Greeks, and before the invention of the mariner's compass it was the star

"Whose faithful beams conduct the wandering ship
Through the wide desert of the pathless deep."

BEAR and BULL, two terms applied in the stock exchange and at the board of trade. They were first used in London with reference to two parties having contracted, the one to deliver and the other to take stock at a future time at a specified price, and in the intervening time the party to deliver sought to depress the price and the party to receive sought to raise the value. From this circumstance the former came to be called a bear, in allusion to the habit of that animal to pull down with its paws, and the latter a bull, from the custom of that animal to throw up its horns. At present the term is used very generally in America and Europe. Those who wish to lower the price are said to *bear stock,* and those who wish to raise it, *bull stock.*

BEARBERRY (bâr'bĕr-rȳ), a small shrub native to America and Eurasia, and found widely distributed in Canada and the northern part of the United States. It has evergreen leaves and produces red berries, which are eaten by wild fowl and other wild animals, especially the bear, hence the name. Some species are used in medicine as an astringent tonic.

BEARD (bērd), the hair on the lower part the face of a man, which appears at the age of puberty. Its color is usually lighter than the hair of the head. It is a protection against cold, and serves in preventing dust from being inhaled. Among ancients a long beard was a mark of manliness, and slaves were deprived of beards, though Alexander the Great required his army to shave. The barber's art was first introduced in Rome about 300 B. C. The Normans, at the time of their invasion of England, shaved the entire face and part of the back of the head. Louis XIII. of France was not endowed by nature with a beard, and during his time ornamental trimming of the beard and mustache became general in France, and thence spread over the continent. In the 16th century clergymen generally wore long beards, a custom still common among the priests of Western Asia. The face was wholly shaven at the beginning of the 18th century, but the practice of wearing beards and mustaches was again inaugurated by France in the early part of the last century, and the custom is now quite general.

BEARD, William Holbrook, a painter, born in Painesville, Ohio, April 13, 1825; died Feb. 20, 1900. He studied painting in America and Europe, and in 1857 visited and painted in Italy and Germany. In 1860 he settled in New York. The chief productions include "Bears on a Bender," "Darwin Expounding His Theories," "Dance of Silenus," and "Bulls and Bears in Wall Street."

BEARDSHEAR (bērd'shēr), **William M.,** educator, born near Dayton, Ohio, Nov. 7, 1850; died Aug. 5, 1902. After attending the rural schools in his district, he took a course in the schools at Dayton, and in 1864 joined the army of the Cumberland. Subsequent to the war he graduated from Otterbein University and took a post graduate course at Yale University, and in 1881 became president of Western College at Toledo, Iowa, where he rendered efficient services in 1881-89. In the latter year he was elected superintendent of schools in Des Moines, Iowa, and after two years was made president of the Iowa State College at Ames, which position he held until his death. He was president of the Iowa State Teachers' Association and of the National Educational Association. He was active as a lecturer and published a number of addresses and pamphlets relating to education.

BEARDSTOWN, a city in Cass County, Illinois, 45 miles northwest of Springfield, on the Illinois River and on the Baltimore and Ohio and the Chicago, Burlington and Quincy railroads. It has large machine shops and manufactures brick, flour, and machinery. The features include the city hall, high school, public library, federal building, and Masonic Temple. It was settled in 1826 and incorporated as a city in 1849. Population, 1920, 7,111.

BEAR LAKE. See **Great Bear Lake.**

BEAR RIVER, a river of northern Utah and southern Idaho It rises in Summit County, Utah, in the Uinta Mountains, flows north into Idaho, and after a circuitous course of about 400 miles discharges into Bear River Bay, an inlet from Great Salt Lake. It is geologically an interesting stream and passes through a region greatly diversified by mountains and desert tracts of land. The Oregon Short Line Railway follows the valley through a portion of Wyoming and Idaho. In Bear Lake County, Idaho, it passes through the northern extremity of North Lake, which is considered a part of Bear Lake lying immediately south.

BEATRICE (bē'à-trĭs), county seat of Gage County, Nebraska, on the Big Blue River, about forty miles south of Lincoln, on the Chicago, Rock Island and Pacific, the Union Pacific, the Burlington Route, and other railroads. Besides numerous substantial buildings, it has a fine stone courthouse, a Federal building, and a public library. The city has excellent public schools and a business college, and is the seat of the Nebraska Instition for Feeble-Minded Youths. It is noted for its quarries of magnesian limestone, which is used largely for building material. The manufactures consist of clothing, flour, and machinery. Large quantities of cereals and live stock are shipped to eastern and southern markets. Population, 1900, 7,875; in 1920, 9,664.

BEATRICE PORTINARI (bē'à-trēs pōr-tē-nä'rē), a woman famous in poetry, born in 1266; died in 1290. She was the daughter of a wealthy family of Florence, Italy, and married Simone dei Bardi. Dante met her when she was nine years old, dressed in a gown of dark red color, and her appearance made a lasting impression upon him. He met her again nine years later, clad in a gown of white, and from that time she was his inspiring muse, though he never saw her again and she died at the age of twenty-four. It is doubtful whether she reciprocated his affection, but her soul glided about him and his poems afford evidence of the depth of his feeling. He recounts his love for her in the "Vita Nuova," and in the 30th and 31st cantos of "Purgatory" she is made the emblematic personification of divine wisdom.

BEAUHARNAIS (bō-är-nā'), **Eugène de,** soldier and statesman, born in Paris, France, Sept. 3, 1781; died in Munich, Germany, Feb. 21, 1824. He was closely connected with Napoleon Bonaparte; his mother, Josephine, became the wife of the latter. He accompanied Napoleon to Egypt in 1798, where he was severely wounded, and in 1805 became viceroy in Italy. After the defeat of Napoleon at Waterloo he delivered Upper Italy and Lombardy to Austria. Later he was granted the title of Duke of Leuchtenberg by the King of Bavaria, whose daughter he married, and resided at Munich. His sister, Eugénie Hortense, became the Queen of Holland by her marriage with Louis Bonaparte, and Napoleon III. was her youngest son.

BEAUMARCHAIS (bō-mär-shā'), **Pierre Augustin Caron de,** celebrated wit and dramatist, born in Paris, France, Jan. 24, 1732; died there May 19, 1799. At first he engaged in literature and published two dramas. Later he became a skilled musician and taught the daughters of Louis XV. to play the harp and other instruments. His close connection with the royal house caused his promotion to noble rank and to office. He greatly aided the American revolutionists by supplying them with large quantities of arms and ammunition. Subsequently he supported the French Revolution and was obliged to seek safety by leaving France. His reputation as a dramatist rests largely on his productions entitled "The Barber of Seville," "The Marriage of Figaro," and "Eugénie." Many of his writings are still widely read and are popular for their wit and satire.

BEAUMONT (bō'mŏnt), a city in Texas, county seat of Jefferson County, on the Neches River. It is situated on gently rolling ground and has transportation facilities by the Kansas City Southern, the Texas and New Orleans, and other railroads. The surrounding country contains productive deposits of petroleum and natural gas, which take high rank among the most important of America. The chief buildings include the county courthouse, the central high school, the post office, the public library, and Hotel Beaumont. It has electric street railways and other municipal improvements, and is an important market for petroleum, lumber, and farm produce. The manufactures include lumber products, machinery, petroleum products, utensils, and clothing. Its rapid growth dates from the discovery of petroleum in 1901. Population, 1900, 9,427; in 1920, 40,422.

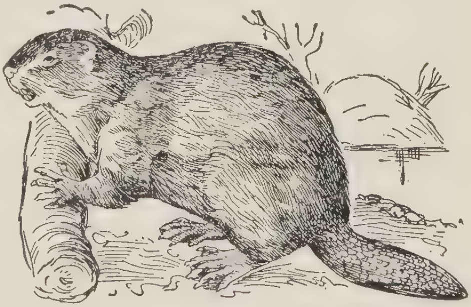
BEAUMONT, Francis, a contemporary of Shakespeare, born at Gracedieu, England, in 1584; died in 1616. He was educated at Oxford University and studied law, but soon gave up the law profession to engage in literary work. He formed the friendship of John Fletcher (1576-1625), and in company with him did much of his writing. He was one of the most versatile writers of the Elizabethan age. The most noted productions of Beaumont and Fletcher are "Cupid's Revenge," "The Coxcomb," "The Maid's Tragedy," and "The Faithful Shepherd."

BEAUMONT, William, surgeon, born at Lebanon, Conn., in 1796; died in Saint Louis, Mo., April 25, 1853. His fame is due to observations taken through an opening from the outside into the stomach of a Canadian, Alexis Saint Martin, who had been wounded in the United States army. Dr. Beaumont cared for the patient, who recovered and the wound in the side healed, but left an aperture of about two inches in diameter. Through this he examined the action of the gastric acid in the process of digestion, which he afterward described. His discoveries proved of importance in the study of physiology.

BEAUREGARD (bō're-gärd), **Peter Gustave Toutant,** soldier, born near New Orleans, La., May 28, 1818; died there Feb. 20, 1893. He was the son of an aristocratic family of Canadian-French origin and graduated at West Point in 1838, in a class with Generals Irvin McDowell and William F. Barry. He served as second lieutenant of engineers through the Mexican War, and was made captain and brevet major in 1847. In 1860 he became superintendent of the United States Military Academy with the rank of colonel, which position he resigned to enter the Confederate army as brigadier general. In April, 1861, he commanded at the bombardment of Fort Sumter and gained a victory at Bull Run in July, for which victory he was made general, and a year later he assumed control of the Confederate army in the west. In 1862-64 he conducted the defenses of Charleston, S. C., then reinforced General Lee at Richmond and defeated B. F. Butler at Drury's Bluff. At the close of the war he surrendered to General Sherman, returned to New Orleans, and served as president of the New Orleans and Jackson Railroad Company. In 1866 and 1869 he was offered the command of the Rumanian and Egyptian armies, but declined. In 1878 he became president of the Louisiana Lottery Company. Beauregard attained to high rank among the Confederate military commanders.

BEAUVAIS (bō-vȧ'), a city in France, capital of the department of Oise, on the Thérian River, forty-one miles northwest of Paris. It is nicely situated in a fertile valley and has manufactures of Goeblin tapestry, woolen goods, carpets, and cotton textiles. Railroad and electric facilities are among its improvements. The chief building is the cathedral of Saint Pierre, in the Gothic style, but it is not entirely finished. Beauvais was besieged in 1472 by Charles the Bold, Duke of Burgundy, who was repulsed after a heroic defense under the leadership of the heroine Jeanne Lainé. Population, 1921, 17,265.

BEAVER (bē'vẽr), a rodent quadruped valued for its fur. The body is about two feet long, has a flat, scaly tail ten inches long, and weighs from thirty to sixty pounds. Its color is chestnut or reddish-brown, but sometimes black ones are found, and some are white. The feet have five toes. The fore feet are designed for work in preparing material for habitations, and the hind feet are webbed for swimming. Beavers are found mostly in the northern parts of North America and Eurasia, but small colonies still exist in Central Europe. They are most numerous in the northwestern parts of North America and Central Russia, but formerly they were very common in all parts of these divisions.



BEAVER.

Beavers are classed among the semi-aquatic animals that live near lakes, rivers, and other waters where trees and shrubs abound. Their houses are built at the edge of the water, and they dam bodies of water that are sufficiently shallow to freeze solid in the winter, in order to increase the water mass and thus prevent it from freezing to the bottom. These dams are constructed of small trees, stones, and grasses mixed with mud. The mud is put on with the feet and smoothed down by the tail, which resembles a trowel. They are skillful at cutting down trees, even as thick as one foot in diameter, and usually cut in largely from the side near the water so as to cause the tree to fall in that direction. Their work is done at night. They subsist on roots, bark, and water plants, of which they lay by a sufficient supply for the winter.

The beaver is valuable for its fur, which is used for ladies' cloaks, for dress trimmings, and for men's collars and gloves. In the 17th century beaver fur was used largely in the manufacture of men's hats, from which high hats came to be called *beavers.* Similar hats are now made with silk plush covering. In the early part of the last century fully 200,000 beaver skins were exported annually from America, but the trade has become greatly limited, owing to a general destruction of the beaver in settled districts. The meat of the beaver is prized as an article of food, but the tail is a delicacy. The animal yields an antispasmodic medicine.

BEAVER DAM, a city of Wisconsin, in Dodge County, about sixty miles northwest of Milwaukee, on the Chicago, Milwaukee and Saint Paul Railroad. It is beautifully situated on Beaver Lake, near the outlet, which furnishes water power. It has a public library and is the seat of Wayland Academy. The manufactures include flour, hardware, machinery, hosiery, and farming utensils. It was settled in 1841 and incorporated in 1856. Population, 1905, 5,615; in 1920, 7,992.

BEAVER FALLS, a city of Beaver County, Pennsylvania, on Beaver River, across the river from New Brighton, thirty miles northwest of Pittsburg. It is located in a fertile district, which produces cereals and live stock, and on the Pittsburg & Lake Erie and the Pennsylvania railroads. The city has an abundance of water power, and coal and natural gas are obtained in the vicinity. The manufactures include cars, fence wire, ironware, stoves, machinery, flour, and farming implements. The chief buildings include the high school, the post office, and the public library. It was formerly called Brighton. Population, 1920, 12,802.

BEBEL (bā'bĕl), **Ferdinand August**, public man, born in Cologne, Germany, Feb. 22, 1840. He learned the art of a turner and began business as a master turner at Leipzig in 1864, and soon became prominent in labor organizations. In 1868 he was made chairman of a permanent committee appointed by the labor unions to promote legislation. At Eisenach, in 1869, he founded the social-democratic party, an organization similar to that established by Carl Marx in London. In 1872 he was sentenced to imprisonment on a charge of *lèse-majesté* against the Emperor of Germany. He served in the Reichstag as a social democrat almost continuously after 1871, and became prominent as a writer and lecturer in the socialistic movement. His chief publications are "The Woman and Socialism," "The German Civil War," "The Parliamentary Act of the German Reichstag and of the Landtage," and "The Influence of Woman in the Past, Present, and Future." He died Aug. 13, 1913.

BECHUANA (bĕch-ōō-ä'nȧ), a race of people that occupy the interior part of South Africa, including the region north of Cape Colony and a large part of the Kalahari Desert. They have frizzled hair, but not kinky, thick lips and nostrils, and are of a dark brown or bronze color. The language spoken belongs to the Bantu family and is copious and expressive. Their chief occupation is cattle raising and agriculture, and they engage in a small way in mining and manufacturing. In the mode of life they are not nomadic, but live in villages. The section occupied by them is known as Bechuanaland, which was long a crown colony of England, but was annexed to Cape Colony in 1895. See **Cape Colony.**

BECKER (bĕk'ẽr), **George Ferdinand,** geologist, born in New York City, Jan. 5, 1847; died April 20, 1919. He studied in his native city and in 1868 graduated at Harvard University. Subsequently he took courses at the universities of Heidelberg and Berlin, Germany, and in 1875-79 was instructor in mining and meteorology in the University of California. For a number of years he was associated with the United States geological survey, made a trip to South Africa in 1896 to examine the gold and silver mines of that region, and in 1898 went as geologist to the Philippine Islands. Subsequent to the Spanish-American War he returned to the United States, when he was made director of the Division of Chemical and Physical Research. His study of ore deposits and geological formations led to a better understanding of mineral deposits in the western states. Among his published works are "Geology of the Comstock Lode and the Washoe District," "Gold Fields of the Southern Appalachians," "Statistics and Technology of the Precious Metals," and "Geology of the Quicksilver Deposits of the Pacific Slope."

BECKET, Thomas à, prelate and statesman, born in London, England, in 1118; murdered at Canterbury, Dec. 29, 1170. He studied theology at Oxford and Paris, and afterward took courses in law at Bologna and in Burgundy. At the recommendation of Theobald, Henry II. made him high chancellor, the duties of which office he discharged vigorously. Afterward he resigned his chancellorship and became a powerful factor in the religious history of England. On account of a disagreement with Henry II., he was slain before the altar of Saint Benedict by four barons. He was made a saint by the pope, and Canterbury cathedral was long an objective point for many pilgrims. One of these pilgrimages is described in Chaucer's "Canterbury Tales."

BECQUEREL (bĕk-rĕl'), **Antoine Henri,** physicist, born in Paris, France, in 1852; died Aug. 25, 1908. From his father, Edmond Becquerel (1820-91), he inherited a taste for science. He entered the Ecole Polytechnique at the age of twenty, and subsequently took a course in engineering at the Ecole des Ponts et Chaussées. In 1878 he entered the Museum of Natural History, was made a member of the Academy of Sciences in 1889, and was chosen professor of physics at the Ecole Polytechnique in 1895. He carried on experiments in light and electricity and made a number of valuable discoveries relating to the solar spectrum. The phosphoroscope, an instrument useful in studying phosphorescence, was invented by him. He discovered the *Becquerel* rays, emanations projected by the X-rays, and did much to extend knowledge of radium and all radio-active substances. He published many scientific papers. His "Researches on a New Property of Matter" is a treatise on radio-active substances.

BED, an article of household furniture in which to sleep. Savages sleep on the ground or on skins of animals, while the Japanese sleep on mattresses, using a wooden rest for their heads which closely fits to the neck, and the Chinese use low bedsteads generally elevated only a small distance above the floor. The beds used in America are similar to those common to Europe. They consist of a mattress supported from the ground by a bedstead. Some use folding beds, which serve for beds at night and articles of furniture in the daytime. In former times feathers were the principal articles used in making beds and bed coverings, and they are still used, but mattresses now form one of the chief articles used for bedding. Bedsteads were formerly made exclusively of wood; now they consist largely of iron frames with steel springs covered with mattresses. The best mattresses are made of horsehair, while cheaper grades are made of shavings of paper and wood.

BED, or **Stratum,** in geology, a layer of stratified sedimentary rock of similar materials. Formations of this kind are due to the ebb and flow of the tide, and to the movement of silt or material deposited by rivers and the action of waves. The strata differ materially, consisting of several layers or of single sheets or beds. A thin layer is called *lamina* or seam, and where several beds of the same kind of rock are deposited the aggregate is termed a formation.

BEDBUG (bĕd'bŭg), an insect found in pigeon houses, nests of swallows and bats, and in beds. It hides away in the daytime and comes out to seek its food at night. The body is flat and the head small. The younger insects are almost white, while the adults have a reddish color. Their food consists largely of blood drawn from the body by pricking through the skin and sucking it out. Bedbugs are eaten by cockroaches, by which they are killed in large numbers.

BEDDOES (bĕd'dōz), **Thomas,** physician, born at Shiffnal, England, April 13, 1760; died Dec. 24, 1808. He studied at Oxford and in London, and in 1788 was appointed lecturer on chemistry in the University of Oxford, but resigned after four years to devote his attention to literature. His work entitled "The History of Isaac Jenkins" is a moral tale in which the rules of health are laid down for the working classes. In 1798 he joined Humphry Davy in opening a hospital at Clifton for the treatment of diseases by medicated gases.

BEDE (bēd), or **Baeda,** eminent scholar, born in Wearmouth, England, in 673; died May 26, 735. He studied at Saint Peter's monastery in his native town, and in 703 was ordained priest by John of Beverley. His writings treat of a variety of subjects, including grammar, music, history, and astronomy. He is regarded the most distinguished scholar of his period in England and came to be surnamed *The Venerable.* The most important of his writings is "Ecclesiastical History of the English Nation," which was translated into Anglo-Saxon by King Alfred.

BEDFORD (bĕd'fẽrd), a town in England, capital of Bedfordshire, forty-five miles northwest of London. It is pleasantly situated on the Ouse River and has railway facilities. The public buildings include a library, a prison, an insane asylum, and a fine Gothic church. Ironware is manufactured extensively, especially farming implements, and it has a large trade in lace, corn, and straw hats. Near the town is Elstow, the village where John Bunyan was born, and he wrote his "Pilgrim's Progress" while a prisoner in the town jail of Bedford. Population, 1921, 35,114.

BEDFORD, county seat of Lawrence County, Indiana, in the southern part of the State, on the Baltimore and Ohio and other railroads. In its vicinity are important deposits of limestone, which is quarried extensively for building purposes. It has railroad shops, roundhouses, machine shops, and other industries. The city has a considerable trade and fine public buildings, and is the seat of Bedford Business College. It was settled in 1756 and incorporated in 1817. Population, 1900, 6,115; in 1920, 8,963.

BEDFORD, Sir Frederick George Denham, British statesman, born Dec. 28, 1838. He entered the royal navy in 1852, and was present at the bombardment of Odessa and Sevastapol. In 1855 he took part in the bombardment of

Sweaborg, commanded the *Serapis* during the visit of the Prince of Wales in India, and in 1884 organized the flotilla on the Nile. He was made commander in chief at the Cape of Good Hope in 1892 and had charge of the west coast of Africa, and subsequently conducted an expedition against Fodi Silah in Gambia. For four years, beginning in 1899, he was in command of the military station of the West Indies and North America, and in 1903 became governor of Western Australia.

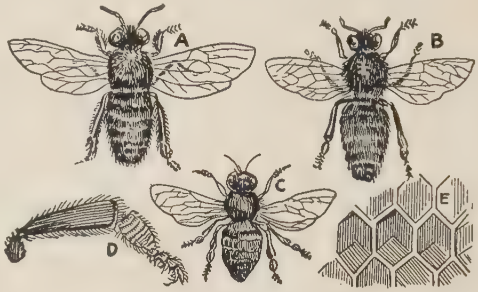
BEDFORD, John Plantagenet, Duke of, son of Henry IV., King of England, born in 1389; died at Rouen, France, Sept. 19, 1435. He rose to eminence in the military service. In 1416 he defeated the French fleet and the next year commanded an expedition against Scotland. Later he became regent of France, where he pursued ably and successfully a popular policy. One of the most memorable, but saddest, events of his life, was the execution of the Maid of Orleans, known as Joan of Arc, in 1431.

BEDLAM (bĕd'lam), or **Bethlehem,** a celebrated hospital for the insane in London. It was formerly the priory of Saint Mary of Bethlehem, and was converted into an asylum in 1647. The patients were removed to Saint George's Fields in 1814, where the accommodations are first class. Bedlam became notorious because the inmates were treated very brutally, hence the name is synonymous with a place of uproar or wild confusion.

BEDLOE'S ISLAND (bĕd'lōz), so named from the former owner, and secured as property of the government in 1800. It is located in New York Harbor, within the corporate limits of New York City, about one mile southwest of the Battery. The area is thirteen acres. In 1841 the government erected a fort upon it, known as Fort Wood, and in 1884 it became the site of the statue of "Liberty Enlightening the World."

BEDOUINS (bĕd'ōō-ēnz), meaning *dwellers in the desert,* a Mohammedan people of the Arab race who lead a wandering life in the deserts of Northern Africa and Western Asia. Originally they were confined to the deserts of Arabia, but at the present time they occupy many regions. They engage in the occupation of shepherds, horse breeders, and herdsmen, and often secure means of subsistence by robbery and plunder. Their government is in families under shieks, or tribes under emirs. Though ignorant of written books, they know history by tradition, most of which relates to the genealogy of their own people. The men dress in long shirt-skirts, protect their feet with sandals, and wear red and yellow handkerchiefs to cover their heads. They manufacture their own material for clothing, subsist largely from their herds, and eat locusts, rice, honey, and the flesh of small animals. Some tribes are advanced in agriculture and have fixed homes. The lance is the weapon in general use among the Bedouin tribes.

BEE, the name of any one of a large group of insects, of which the honeybee is the most important representative. In the classification of Linnaeus, all the insects of this group were assigned to the genus *Apis,* but this term is now generally restricted to the honeybee, and the group is classified as two families, the *Apidae* and the *Andrenidae.* In general, it may be said of bees that the head and thorax have feathery hairs, the hind feet are flattened, and the tongue is fitted to lap the nectar of flowers. Probably about 5,000 species are included in the group. The honeybee is considered the most intelligent of the insects. Owing to its industry and the useful product resulting from its labor, it has from remote times attracted general attention and interest. It is probable that more has been written about bees than about any nation of people. At present they abound in almost all parts of the world, except in extremely cold regions.

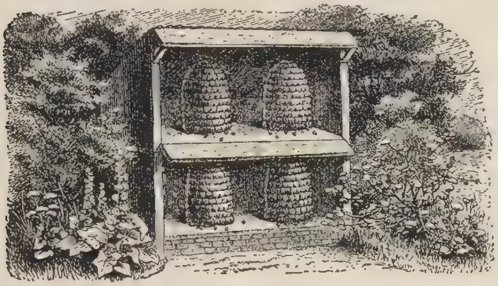


A. Drone; *B,* Queen: *C,* Worker; *D,* Leg of Worker; *E,* Cells for Honey.

The Honeybee. The honeybee lives in communities or *swarms* made up of three classes: *queens, workers,* and *males.* The workers are females whose generative organs are imperfectly developed and they rarely produce eggs. In each swarm there is but one true female, called the *queen.* She is impregnated by the male while in the air and never leaves the hive at any other time, except when swarming. A short time after impregnation she begins to lay the eggs, one in each cell, and some days she deposits as many as 2,000. The queen bee is longer than either the males or the workers and can be easily distinguished from the others. The males are called *drones* from the low humming sound which they make in their flight. They do not work and average usually about one drone to every thirty bees. All the work of the society is done by the workers. They gather the honey, make the wax, build the cells, and feed and take care of the young. After the swarming season is over, they kill or expel the drones, as if to economize the food which they lay up for winter.

The eggs are deposited in different cells, some for workers, and others for drones and queens. The eggs produce small white larvae in about three days. They are fed with pollen or dust of flowers mixed with water and honey by the workers. After being fed five or six days, they begin to spin a cocoon around themselves. The young bees mature from the cocoon in about sixteen days. The queen bee inspects the size of the hive and the number of young queens about to leave the cocoons, and if she finds the swarm small the young queens are killed, but if the society is large one is permitted to come out.

When the young queen appears, the old queen goes from the hive and takes with her a part of the bees, forming a new community. This is called swarming and takes place in the summer season; in the temperate climates this occurs two or three times each season. The new swarm may be easily secured by watching the society in the swarming season, and keeping an empty hive near by, in which the bees will soon begin to make honeycomb and deposit honey. But if no such hive is provided, and in timber districts where communities live in trees, the new swarm moves from place to place until it finds a hollow tree or some suitable place in which to found its home. The old hive is governed by the new queen until another queen appears, when she forms a swarm and seeks a new location. In cases where two queens come out at the same time, as they sometimes do, they fight each other until one of them is killed.


OLD STYLE BEE HIVE.

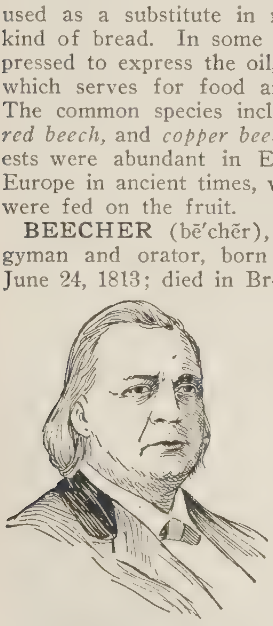
Bees are very active and strong. They make flights to gather food at great distances, which they easily endure without stopping to rest. When they are some distance from the hive, they fly up into the air to observe the direction, and then take the shortest line for the hive. In timber districts, where bees hive in trees, they seek water at the brooks, and their location may be found easily by observing the direction in which they fly after leaving the brook, or the flower where they gathered food. From this habit of bees we have the term *bee line*. The workers and queens each have stings in the back of the body, while the drones are stingless. The sting of a bee is effected by making a wound with a sheath, into which poison is injected and a dart is thrust in to deepen the wound. When the sting is lost, the bee dies. Insects die from the effect of a bee sting, while man and animals have been killed by the attacks of large swarms. The health of bees is remarkable and their diseases are few. The greatest cause of harm is want of good sanitation, too close confinement, dampness, and want of ventilation. In caring for bees it is necessary to provide them with abundant pasture. New swarms should be fed with syrup. An abundant supply of water is essential to good health.

Pollen and the sweet juices of flowers are the food of bees. They go from flower to flower and gather the pollen on the hairs of their legs, while the sweet juices of flowers are taken up by the trunk. The trunk is made up of several divisions so it can be turned easily, bent, shortened, or lengthened to fit the flower cup, which enables them to easily gather the sweets. The front legs and trunk serve to gather juices and pollen from flowers not full blown. The juices are passed from the trunk into a kind of stomach or honey-bag, where they are changed into honey. This stomach serves only for the purpose of making honey, as they possess a second stomach for the digestion of food. The stomach for honey is so constructed that its contents may be utilized at any time for storing in the cells or feeding the young. The workers make the wax by a process of growth on the back part of the body, where a pouch is located filled with wax sticks, from which it is taken by the bees and used in making honeycomb. The honeycomb is constructed of cells, some being used for honey and others for eggs. These cells are in the form of a hexagon, which form serves the best purpose and economizes space.

The cells in which honey is deposited are slightly larger than those intended for hatching, and are constructed nearly horizontally, which admits of easy filling, and the honey is retained in the cells chiefly by capillary attraction. In constructing honeycomb the bees begin at the top of the hive and build downward, placing cells back to back in the process of construction. When the cells are filled with honey they are carefully sealed up with wax to prevent it from escaping. In the construction of honeycomb the entire space is utilized, with here and there small openings to allow the passage to and from the different parts of the hive. Large bee-keepers supply the hive with small frames containing the foundations for honeycomb, which, when filled with honey, are taken from the hive, put in a honey extractor, and the frame with the comb is afterward put back into the hive. In this way the bees are enabled to use one set of comb a number of times, thereby increasing their production of honey. Many bee-keepers feed their bees with syrup, more or less, the entire year, thereby maintaining the swarm and utilizing practically all the honey production. A fair-sized community includes one queen, from five to eight hundred drones, and from fifteen thousand to twenty-two thousand workers. The weight of a good swarm is from six to ten pounds.

Classification. Bees have been variously classified according to their habits. The newest classification, which has been suggested by W. H. Ashmead of the United States Museum, divides them into fourteen groups. Of these the first two, the honeybee and the bumblebee, are called social in their habits, because they live in communities. All other bees are solitary in their habits, each one living and working alone. They include some very interesting species, such as the leaf-cutting bee, which cuts off the leaves of plants to line its nest. Another is the carpenter bee, which bores tunnels into the stems of pithy plants, such as the brambles, in which the eggs are laid. The mason bee builds its nests of mud or moistened clay. Bees as a whole are extremely useful in the cross fertilization, since they carry the pollen as they pass from bloom to bloom. Indeed, clover can be grown successfully only where this work is done by bees.

BEECH (bēch), a useful and well known deciduous tree of America and Eurasia. It grows to a height of about one hundred feet and a diameter of four feet, and is a fine ornamental tree, especially when standing alone. Its wood is solid, but brittle, and when exposed to air rots easily or is eaten by worms. Under water it is very durable, and thus serves a good purpose in constructing sluices and water mills. In France it is used in the manufacture of wooden shoes, and in many countries for furniture. The fruit is a three-sided nut and is used as a substitute in making coffee and a kind of bread. In some countries the fruit is pressed to express the oil, known as *beech oil,* which serves for food and lighting purposes. The common species include the *white beech, red beech,* and *copper beech.* Large beech forests were abundant in England and Western Europe in ancient times, where herds of swine were fed on the fruit.



HENRY WARD BEECHER.

BEECHER (bē′chẽr), **Henry Ward,** clergyman and orator, born at Litchfield, Conn., June 24, 1813; died in Brooklyn, N. Y., March 8, 1887. He was the son of Dr. Lyman Beecher and for forty years, from 1847 to 1887, ranked as the most eloquent, powerful and magnetic minister of Plymouth Church, Brooklyn, N. Y. He was educated at the Boston Latin School, Amherst College, and Lane Seminary at Cincinnati. In 1837 he began his pastorate at Lawrenceburg, Ind. Two years later he was called to Indianapolis as pastor of a Presbyterian church, and in 1847 entered upon his famous career at Brooklyn. He was popular because of his unequaled boldness, general humor, power to illustrate, sonorous voice, and skill in undertaking the exposition of social and political evils.

He delivered a masterful oration, in 1859, on the life and character of Robert Burns. In 1863 he lectured to the people of England, who had formed a wrong impression of the Civil War in America and regarding the cause of perpetuating the American Union, and for his service in influencing public opinion in that country he was invited to deliver an oration on the anniversary of the surrender of Fort Sumter in 1865. A noted church trial between him and Tilton resulted in a disagreement of the jury; nine of the twelve decided for Mr. Beecher. He was in great demand as a lecturer and gave lecture courses at Yale and other institutions of learning. In 1882 he declared his disbelief in eternal punishment. Politically he was a Republican, but in the presidential campaign of 1884 he supported President Cleveland. Among the many productions from his pen are articles published in the Cincinnati *Journal,* the *Farmer and Gardener,* the New York *Independent,* and the *Christian Union.* His best known books are "The Life of Christ," "Lectures to Young Men," and "Notes from Plymouth Pulpit."

BEECHER, Lyman, clergyman and theologian, born at New Haven, Conn., Oct. 12, 1775; died in Brooklyn, N. Y., Jan. 10, 1863. He was a descendant of New England ancestors, who settled in New Haven in 1638, and father of Henry Ward Beecher and Harriet Beecher Stowe. His mother died while he was an infant, and he was adopted by Lot Benton, an uncle. In 1797 he graduated at Yale, and began his clerical career in the Presbyterian Church at East Hampton, Long Island, where he remained eleven years. He next accepted a call to Litchfield, Conn., where he ministered to the wants of the church for sixteen years and won renown by his powerful and fearless denunciations of intemperance. In 1826 he accepted a call to Hanover Church, Boston, and during the great controversy between Dr. Channing and Congregationalism he warmly upheld the Puritan doctrine. After six years he became the president of the Lane Theological School near Cincinnati, and in 1842 returned to Boston to revise his books. His best known works are "Remedy for Duelling," "Views on Theology," and "Sermons on Temperance." He spent the last years of his life at the home of Henry Ward Beecher, in Brooklyn.

BEE-EATER (bē′ēt-ẽr), the name applied to several birds related to the kingfisher. They have long wings and a greenish color, resemble swallows in flight, and prey upon wasps, bees, and other insects. Their nests are built in holes, which they construct in river banks or on the seaside. In many places, especially on the Volga and Don, they have honeycombed the banks by excavations. In some countries they are a pest on account of their destruction of bees, which they catch on the wing. Their feathers are valuable as an article for ornaments.

BEEF (bēf), the flesh of the ox or cow, used either fresh or salted. It is the most nutritious of all meats, and is well adapted to the most delicate constitutions. A beefsteak is known by the part of the animal from which it is taken, as rib, sirloin, or round. Porterhouse, sirloin, and prime are considered the best cuts. The best quality comes from well-fed animals. The cut edge of good beef is bright red in color, and should be of a uniform tint, except where marked by fat and connective tissues. It loses twenty per cent. of its weight in roasting and thirty per cent. in boiling. In the raw state it contains fifty per cent. of water. It possesses the greatest amount of nutrition when fresh, but is preserved by canning, salting, drying, and many other ways with good results. Beef producing and beef packing are two highly important industries in the United States and Canada.

BEEFEATER, the name of a bird of the starling family, native to South Africa. It associates with the buffalo, camel, and cattle, and feeds upon the larvae of flies. Birds of this class are sometimes called *ox-peckers.* The name "beefeaters" has been applied for many years to the yeomen of the royal guard in Great Britain. Their costume is in the fashion of the time of Henry VII. and has been changed but slightly for four centuries.

BEEF EXTRACT, an article of diet obtained by extracting the juice of beef and then evaporating the water. It is prepared by placing the meat in a large kettle with a dome-shaped cover, and extracting the juice by heat. An outer jacket, filled with water, surrounds the lower part of the kettle, serving to apply the heat uniformly, and after the juice is drawn off it is strained and put into jars or cans and sealed hermetically. Beef extract has about forty times the nutriment of beef, and is important as a food for infants and invalids. It is prepared for service in the form of soup or beef tea.

BEER (bēr), a beverage prepared by means of a process of fermentation from malt, hops, and water. The malt for general manufacture is made of barley, but wheat, oats, rye, corn, and India rice are used to some extent. The different kinds of beer are usually classed as *porter* and *ale;* the latter is prepared chiefly from pale malt and has a pale amber color, while the former is prepared by using a portion of roasted or black malt along with the pale malt. This has the effect of giving porter a somewhat bitter flavor and a darker color. These two classes are again subdivided into a great many varieties, depending upon the strength of the hops and the malt added. Mild ale, bitter ale, barley wine, pale ale, and table beer are terms by which the different varieties are known.

From history we learn that beer was a well known beverage among the Egyptians 3,000 years B. C., and was extensively manufactured by the early nations. Larger quantities of it are consumed than of any other beverage. In its manufacture Germany ranked first, Great Britain second, and the United States third. In the United States there were over 2,000 breweries that manufactured annually over 40,000,000 barrels, which was largely consumed within the country, together with several varieties imported from Europe. The consumption of beer in the United States averaged about fifteen gallons for each person, while the consumption in some of the countries of Europe is much larger. In Belgium the consumption per capita is fifty-one gallons; in Great Britain, thirty-six, and in Germany, thirty.

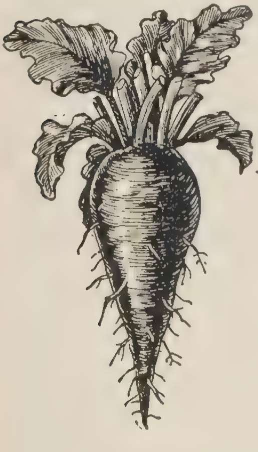
The process of making beer is called *brewing.* The first step in the process is to place the barley or cereal in an iron cistern, where it is soaked or steeped from 70 to 95 hours, when the water is drawn off and the barley placed on the floor of a dark room, where it swells and sprouts as if planted in the ground. This process is called *germination.* When the little sprouts have grown about half an inch long, the largest possible quantity of sugar has been formed. The malt is then taken to a drying kiln, where it is dried for a period depending upon the kind of beer to be made. In making light-colored ales the malt is dried only a short time, while in darker colored ales a longer time is allowed; this depends entirely upon the strength and color desired. After the malt is dried, it is crushed and mixed with hot water in a mash tub. Here another change takes place, by which the starch is converted into sugar, called *grape sugar.* After a few hours the liquid, now called *sweet wort,* is drawn off and boiled with hops in a copper kettle. It is next strained and cooled and put into a fermenting tun, where a little yeast is added, which causes it to froth and bubble up, which indicates that an important change is taking place; that is, the sugar is changed by the action of the yeast into carbonic acid and alcohol.

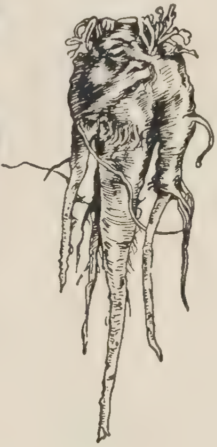
Beer contains from one to ten per cent. of alcohol, the quantity depending of course upon the amount of sugar contained in the malt. Any liquor which has passed through the change of fermentation is known as *fermented liquor.* When this process has been completed, the beer is drawn off into hogsheads and allowed to settle. From this it is pumped into kegs or barrels and stored in cellars for use. While stored, fermentation goes on slowly for some time; the beer remaining in this state for a long time is called *lager beer,* meaning, in German, stored beer, and the beer used immediately after fermentation is called *schenk beer.* The process differs somewhat in different breweries, but the general method is practically the same. The largest breweries in the United States were located at Saint Louis, Chicago, Milwaukee, Philadelphia, Baltimore, and New York. Montreal and Toronto are leading brewing centers of Canada.

BEERSHEBA (bē-ĕr′shė-bȧ), meaning *well of the oath,* a locality about fifty miles southwest of Jerusalem, now called Bir-es-Se-ba. At this place Abraham made an alliance with Abimelech, the Philistine King of Gerar, which he ratified with an oath and a valuable gift of lambs. It was a place of some importance down to the Crusades, but now is a dismal ruin.

BEESWAX (bēz′wăks), the fatty substance secreted by bees and used by them in constructing the honeycomb. It is not collected from plants, but is a secretion elaborated within the body of the animal from saccharine matter or honey, and extruded in scales from beneath the rings of the abdomen. It is an article of commerce, useful in modeling, for candles, and divers other purposes. Before being put on the market, it is purified and bleached or whitened.

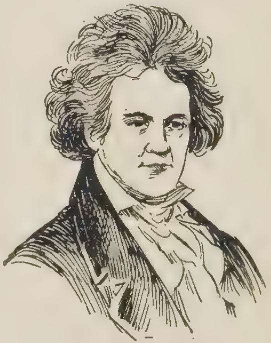
BEET (bēt), a well known vegetable valued as food owing to the large quantities of sugar it contains. Four kinds of this vegetable are cultivated—the *common beet,* the *chard,* the *sea beet,* and the *mangel-wurzel.* The common beet embraces several species, differing in size, color, and shape. The yellow and red beets, usually classed as common beets, are the best for table use, though the chard is a favorite among laborers and agriculturists in France and Germany Gardeners cultivate the sea beet largely for greens. The mangel-wurzel is a coarse, large beet. It is sweet and nutritious, and is stored in cellars for winter use as cattle feed. The white beet is used in the manufacture of sugar.


RED BEET.


SUGAR BEET.

In 1810 Napoleon began to encourage the manufacture of sugar from beets, but the industry developed largely from the discoveries of Count von Arnim (q. v.). Since then large quantities of sugar have been manufactured in Europe from this vegetable, particularly in the German Empire. In the United States experiments in beet sugar manufacture were not extensively made until 1890, when the Department of Agriculture at Washington sent 5,000 packages of beet seed to different parts of the country for the purpose of experimenting in different localities. These seeds were distributed through twenty-eight states and territories, with directions for planting and the culture of the plant. After maturing the crop, about 1,000 localities sent samples to Washington to be used in making tests of their value in beet sugar manufacture. It was found by careful examination that a zone about 200 miles wide, extending from the Atlantic to the Pacific, through portions of New York, Pennsylvania, Ohio, Indiana, Illinois, Iowa, and Nebraska, possesses admirable qualities to develop this industry. Colorado produces more beet sugar than any other State, while Michigan, Nebraska, Kansas, Utah, and California rank high. It is thought that by the larger development of the beet sugar industry the United States will be able to produce sufficient quantities of this product to supply the demand of the domestic market. California alone has sufficient available territory to produce all the sugar now imported, and many other states possess almost equal natural advantages. Canada has a large area of land suitable for the culture of the sugar beet, particularly in British Columbia, Ontario, and Alberta. The industry is developed most extensively in Ontario.

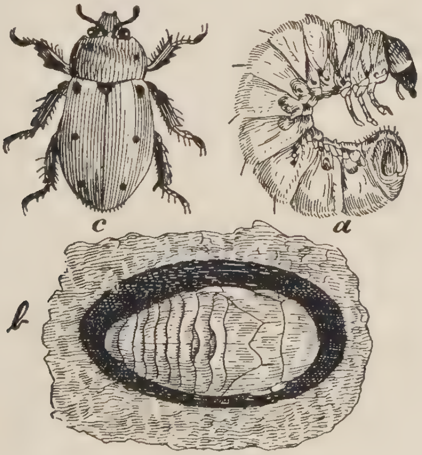
BEETHOVEN (bā-tō′ven), **Ludwig von,** celebrated musical composer, born at Bonn, Germany, Dec. 16, 1770; died March 26, 1827. He takes preëminent rank in music, standing above all the world's composers, a position accorded him by general consent. His works mark a climax in musical history, and usher into the musical world a phase of progress from which modern music has taken its rise. At the early age of four years his father guided the development of his musical talent, and at this early period he played successfully on the harpsichord, the name then applied to the piano. When four-


LUDWIG VON BEETHOVEN.

teen years old he became assistant court organist, and gained a reputation by the skillful production and composition of music. At Vienna he studied under Mozart, and later under Haydn. The piano was his favorite instrument, and he excelled in performing upon it. His fame soon spread throughout Central Europe, and his name was known alike to the poor and rich, the peasant and the nobleman. Many honors were accorded to him by the most important personages of his time. At the age of thirty years he began to lose gradually his hearing, and later became totally deaf. This misfortune caused him to shut himself up with his books and music, but his work went on without intermission.

The compositions of Beethoven include a total of 138. They comprise all the forms of vocal and instrumental music from the simple song to the opera and oratorio, from the sonata to the symphony. His depth of feeling and power of genius were displayed in each of these. Some attain an excellence never approached by composers before or since his time. He displayed remarkable skill on the piano in his pianoforte sonatas, which brought forth the resources of that instrument to a perfection previously unknown. Of his nine symphonies the last, "Choral Symphony," is regarded the most wonderful composition. In dramatic work his "Fidelio" and "Coriolanus" display the deepest pathos and force. All his music excels in beauty and simplicity so perfect that in it is shown a mind bent on thoughts of eternal things and a heart full of love and sympathy.

BEETLE (bē′t'l), an order of insects called by naturalists *Coleoptera,* which means sheathed wings. They possess four wings, an inferior pair, which are the real wings used in flying, and a superior pair that form a protection for the others. In walking they appear to have no wings, so nicely are the real wings covered and protected. The real wings are membranous, while the wing covers are horny, often beautified by green, yellow, blue, and diversified colors. There are no less than 150,000 species showing slight differences in color, size, form, or habits, of which fully 11,000 are native to the region of North America lying north of Mexico. They undergo three full stages in life. At first they are *grubs* or *larvae,* in which form they have three pairs of legs, horny heads, and wormlike bodies; those hatched in fruit and nuts have no legs. The second stage is entered after a case or cocoon has been prepared, though a cocoon is not always provided. This is called the *pupa state,* in which many varieties lie for years before developing into beetles. Most species live on land, though there are a large number that live in water. Land beetles live under rocks, logs, or leaves, among stones, and in holes drilled in wood.

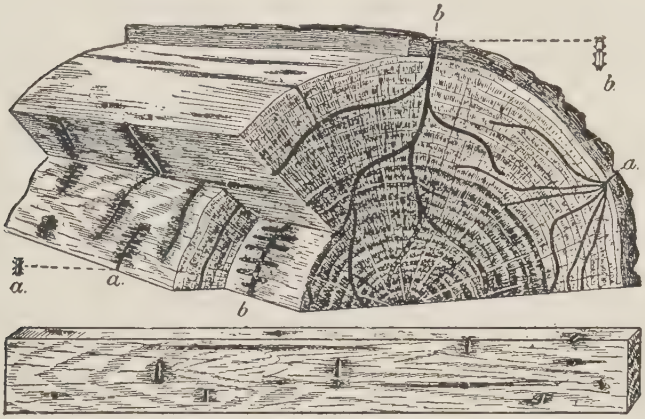


A, LARVA; B. PUPA; C. BEETLE.

Various beetles have been named from their size, form, and habits of life. The *carrion beetles* are those that feed upon dead animals. *Scavenger beetles* live on filth and refuse matter, and are provided with feet fitted to dig holes in the ground. *Sexton beetles* have a very strong scent so they can easily find the dead bodies of small animals, such as frogs, snakes, and mice. These they take to a place where the ground is soft and bury them safely under cover. In these remains they deposit their eggs, and when the young are hatched they feed upon the food provided in this way. The *ambrosia beetle,* of which there are several species, bores in oak and other wood, often doing great damage. A class of beetles extensively known as *tumble bugs* belong to this class. In ancient Egypt they were called *sacred beetles* and were worshiped, for the reason that they are useful in clearing up manure and burying it below the surface. This they do by making round balls, in which they lay their eggs, and then bury them deep in the ground. *Tiger beetles* have stripes and are fierce in combat with other insects. They prey upon other beetles, flies, and caterpillars, and possess cannibalistic tendencies among themselves. The *bombardier beetles* possess a strong liquid, which they shoot at their enemies. Similar beetles include the *spring beetles, horned bugs,* and *curculios.* The last mentioned live in orchards and feed upon fruits and grains. The worms often found in plums, nuts, apples, and various other fruits are hatched from eggs laid by beetles. A species of beetle known as *Spanish fly* is used in making powder and blistering plasters. Other well known beetles are the *potato bug, squash bug, oil beetle, ladybird, glow worm, blister beetle,* and *firefly.* See illustration on following page.

BEETS (bāts), **Nikolaas,** poet and author, born at Haarlem, Holland, Sept. 13, 1814; died in 1905. He studied at Leyden and entered the Protestant ministry, and in 1875 became professor of theology in the University of

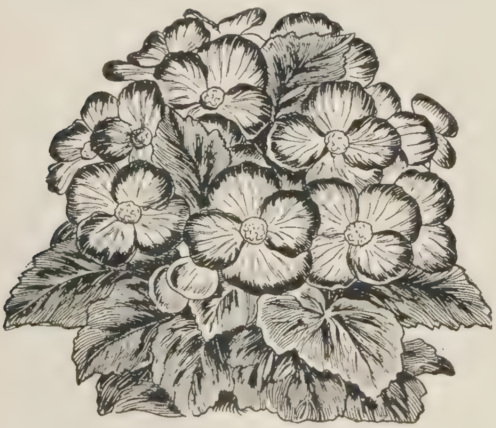
Utrecht. His "Camera Obscura," published under the pseudonym of *Hildebrand,* is one of the finest productions of the last century in the Dutch literature. Other works include "Poems," "Ada of Holland," and "Important Events in the Life of Saint Paul."



OAK WOOD DAMAGED BY THE AMBROSIA BEETLE.
a b, two species of beetles; *c,* log cut from damaged timber.

BEGGAR (bĕg′gẽr), one who continually implores people for alms. The practice of begging may be a necessity with some aged and physically defective persons, while others engage in it from the dislike for work. In 1572 a law of England provided a severe penalty for all able-bodied persons convicted of the offense. Laws prohibiting vagrancy are on the statute books of many countries, the purpose being to prevent beggar vagrants from roaming over the country.

BEGONIA (bē-gō′nĭ-ȧ), the name of a large family of plants, of which several species are cultivated in flower pots and greenhouses. The plants are perennial and include both herbs and shrubs. Among the popular species grown in gardens as flowering plants are those known as *Begonia, Beefsteak Geranium,* and *Glory of Lorraine.* The flowers are largely pink or red. Young plants are raised from the seed, or they may be obtained by dividing the bulbous roots and by cutting and placing the stems in the soil. Many varieties of fine flowers have been propagated from the tuber-root kind.

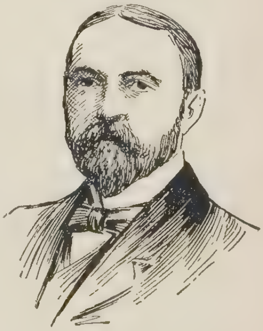


BEGONIA.

BEHEMOTH (bē′hē-mŏth), a large animal described in the Bible (Job xl, 15-24). The description indicates that the animal referred to is grass-eating and lives in or near the water, hence it is thought the author referred to the hippopotamus. In Job xl, 25-31, it is associated with the leviathan. Some writers think that the crocodile, the ox, or the elephant was meant, while others associate the two names with primeval monsters.

BEHISTUN (bȧ-hĭs-to͞on′), or **Bisutun,** a town in Persia, located near a mountain of the same name, and celebrated for the remains of ancient sculptures and inscriptions found in the vicinity. The mountain has an altitude of 1,700 feet, and the most remarkable inscription is in the limestone about 300 feet high. Sir Henry Rawlinson copied the inscription, which was made in the time of Darius I., King of Persia, about 518 B. C., and contains an account of his military triumphs. These inscriptions were made after polishing the rock and applying varnish harder than the limestone. The writing is in the cuneiform characters and in the Median, Persian, and Assyrian languages.

BEHRING (bȧ′rĭng), **Emil Adolf,** physician, born at Hansdorf, Germany, in 1854; died April 1, 1917. He studied medicine at Berlin, and in 1880 took up surgery in the army. In 1894 he became professor in the University of Halle, and later was called to Marburg to a directorship in the Hygienic Institute. His reputation is based principally upon the discovery of diphtheria serum and its successful application as immunity against that disease. His chief publications, "The Resistance to Infectious Diseases" and "The Blood Serum Therapy," mark an era in medical literature.



EMIL ADOLF BEHRING.

BEHRING SEA. See **Bering Sea.**

BEIRUT. See **Beyrout.**

BEJAPOOR (bē'jȧ-po͞or), or **Bijapur,** a ruined city of India, in the presidency of Bombay, 245 miles southeast of Bombay. The site is on a tributary of the Kistna River, and surrounding it are lofty walls of hewn stone. Anciently the city was a great commercial center, and its downfall dates from 1686, when it was captured by Aurungzebe. The tomb of Mahomet Shah and other remains of Mohammedan construction are among the ruins, most of which indicate splendid workmanship and fine examples of eastern art. The modern town is not important and has a population of 17,500.

BELA (bā'lä), the name of four kings of Hungary, of the Arpad family. Bela I. reigned in 1061-1063; Bela II., in 1131-1141; Bela III., in 1173-1196, and Bela IV., in 1235-1270.

BEL AND THE DRAGON, a book of the Old Testament, belonging to the Apocrypha. The Roman Catholic Church regards it a canonical book of the Bible, and the Anglican, Lutheran, and a number of other churches recommend it to be studied for edification. It was probably written in Alexandria in the Greek, and dates from the 3rd century B. C. In the Vulgate version it is part of the Book of Daniel.

BELASCO (be-lȧs'kō), **David,** dramatic author, born in San Francisco, Cal., in 1862. In 1874 he took part as an actor in theatrical plays and early developed originality in devising plays for the local stage, and soon joined James A. Hearne in a tour of the leading American cities. For some time he was manager of Madison Square Theater in New York City and later was connected with the Lyceum Theater, and subsequently gave his time principally to literary work. He joined Franklin Fyles in writing "The Girl I Left Behind Me," which was produced successfully at the Empire Theater. For several years he managed some of the notable actors of America, including David Warfield and Blanche Bates. His chief writings include "The Heart of Maryland," "May Blossom," "Men and Women," "La Belle Russe," "The Darling of the Gods," and "Sweet Kitty Bellairs."

BELFAST (bĕl'fȧst), a city in Maine, county seat of Waldo County, thirty miles southwest of Bangor, on the Maine Central Railway. It has a good harbor on Penobscot Bay and railroad connection with the principal cities of the State. Shipping, printing, and the manufacture of shoes and lumber products are among the chief industries. Granite quarries are worked near the city, and the surrounding country is agricultural. A Masonic temple, a public library, and an Odd Fellows' building are among the chief architectural structures. The first settlement on its site was made in 1870 and its incorporation as a city dates from 1850. Population, 1900, 4,615; in 1920, 5,083.

BELFAST (bĕl-fȧst'), a city of Ireland, county seat of Antrim County, capital of the province of Ulster, about twelve miles from the Irish Sea. It has railway connection with the leading cities of Ireland, is on the Ulster Canal, and has a fine harbor on Belfast Lough. Near it flows the Lagan River, which is crossed by several bridges that connect the city with adjacent villages. It occupies a fine site, but most of the ground is reclaimed marshland. The city is the seat of vast commercial and manufacturing interests, the most important in Ireland. Its products and exports consist of cotton and woolen goods, linen fabrics, ropes, canvas, ships, clothing, and machinery. It is the seat of fine schools and several institutions of higher learning, including Queen's College and the Royal Academic Institution. Among the chief buildings are the museum, the government offices, the Corn Exchange, and the public library. It has extensive botanical gardens, electric street railways, and municipal waterworks. The city is largely Protestant, among whom the Presbyterians predominate. Population, 1901, 349,180; in 1921, 395,492.

BELGIUM (bĕl'gĭ-ŭm), a kingdom of Europe, whose northern boundary is formed by Holland, eastern by Germany, southern by France, and western by the North Sea. In latitude it lies between 49° 30′ and 51° 30′ N., and in longitude 2° 33′ and 6° 6′ E. Its greatest length from southeast to northwest is 165 miles; breadth, 120 miles. The area is 11,373 square miles.

PHYSICAL FEATURES. The surface is made up largely of fertile lowland, though there are some sandy and marshy tracts. A range of the Ardennes Mountains, highest altitude 2,200 feet, traverses the section lying southeast of the Meuse River. From the southeastern part the surface inclines toward the northwest, where dikes are utilized to prevent overflows from the sea. An unfertile tract, the Campine, is in the northern part of the province of Antwerp, but this has been greatly improved by superior husbandry.

The Meuse and Scheldt rivers, though both rise in France, are important for drainage and navigation. The Dender, Lys, and Rupel are tributaries of the Scheldt, and the Lesse, Sambre, and Ourthe flow into the Meuse. Rainfall is abundant and the average temperature is about 50° Fahr. In summer the climate is somewhat hotter than in Great Britain, and the winters are longer and more severe.

Coal is the chief mineral and is found in fields having an area of about 550 square miles, chiefly along the Sambre and Meuse rivers. Marble, slate, and limestone quarries are worked extensively in the eastern part. Other deposits worked more or less extensively include copper, lead, iron, peat, and calamine.

AGRICULTURE. Agriculture has declined somewhat with the development of other enterprises in which capital and labor became interested. The demand for cereals and other farm products is greater than the supply. All of the domesticated animals of Europe are grown profitably, especially cattle, and the dairying interests have been developed very efficiently. Hogs, sheep, and horses are grown in all the provinces. Among the cereals may be mentioned rye, which is grown most extensively, oats, barley, buckwheat, spelt, and sugar beets. The vine is cultivated on large tracts along the Mass River, and tobacco, hops, rape, flax, fruit, and vegetables are grown. About one-sixth of the surface is covered with forests, including beech, oak, elm, and poplar. Forestry is important as an enterprise, and the products have a high annual value. The fisheries of its coast and inland waters yield large returns.

Manufactures. Manufacturing takes first rank among the industries of Belgium and is the chief source of its prosperity. Modern machinery is utilized extensively, but most of the work is done in small shops, in which only two or three workmen are employed. In 1908 there were fully 80,000 establishments in the dwelling houses of workmen who carried on small manufacturing industries without any paid labor. Chief among the larger enterprises is the manufacture of textiles, both linen and woolen, and this industry is represented at Bruges, Brussels, Limburg, Ghent, Liége, and Mechlin. Carpets are made in large quantities at Brussels and Tourney, and Brussels and Bruges are centers for the manufacture of lace and fine lawn and damask fabrics. Other products ranging high in value are machinery, leather, chemicals, glass, furniture, clothing, jewelry, and spirituous liquors. Cheap fuel has caused the development of large steel and iron works, though the ores are mostly imported.

Transportation. A network of railroads covers the entire country, and in proportion to its area Belgium has the greatest railroad mileage in the world. In 1835 the first line, from Mechlin to Brussels, was open for traffic. The government owns nearly all of the railroads, which aggregate a total of over 5,450 miles. Electric lines are operated in all the cities and many suburban districts. Canal transportation of much value is utilized, and the Meuse and Scheldt rivers are navigable throughout their entire length in Belgium. The import and export trade is carried largely through Ostend and Antwerp, and the imports have exceeded the exports for the past fifty years. France, Germany, Great Britain, the Netherlands, and the United States have the largest proportion of trade in the order named.

Government. For the purpose of government Belgium is divided into the nine provinces of Limburg, Namur, Luxemburg, Brabant, Antwerp, Liége, Hainaul, East Flanders, and West Flanders. The executive power of the nation is vested in the king, and the crown is hereditary in the direct male line of descent. A council of ministers responsible to the chambers assist the monarch, and every royal act must be validated by the signature of a minister. Chief legislative power is vested in the king and the chambers, which consists of the senate and chamber of deputies. The senate has 102 members, of whom fifty-six are appointed by the provincial councils and the remainder are elected by direct suffrage of male citizens. The chamber of deputies has 152 members, elected by direct suffrage, and in this branch originate all bills dealing with the revenue. Each province has a council chosen by direct vote, in which is vested the power to legislate in matters of local government. The provinces are divided into *arrondissements,* and these are again divided into smaller districts known as *communes.* Cases tried by the lower courts are subject to review by the court of cassation or supreme court.

The standing army numbers 51,552 men, and the war footing is about 148,500. Wars of aggression are prohibited by the constitution, hence the army is intended only for national defense and the preservation of neutrality. The coins, weights, and measures correspond in name and value to those of France.

Education. The church and state were separated by the constitution of 1831, but religious instruction is directed in the public schools by the Roman Catholic clergy. Support is given to the schools by the state and local governments, and the classes range from the elementary schools in the communes to the higher schools and universities. Higher education culminates in the state universities at Ghent and Liége, and free universities are maintained at Louvain and Brussels. In the higher institutions instruction is given in law, medicine, engineering, arts, and manufactures. Roman Catholic is the religion of most of the people, and this church maintains many parochial schools.

Inhabitants. Belgium is so named from the people anciently called Belgae, who were of the ancient Celtic family. Two types make up the present population, those who descended directly from the ancient Belgae, and those who are a mixture of Celts and Germans. Flemish and French are spoken in the southern part, while German is the language of the northern section. Flemish and French are the official languages. Brussels, the capital, is a large and prosperous commercial center. Other cities of importance include Antwerp and Ostend, both important seaports, and Ghent, Bruges, Liége, Verviers, and Ixells. Belgium is the most densely populated country in Europe. Population, 1921, 7,580,548.

History. Anciently Belgium was a part of Rome, when it was included in the territory known as Belgae. It was the battle ground and center of contention in many European wars, and its territory has belonged to many different nations. The Battle of Waterloo was fought in the province of Brabant, in 1815, after which it was united to Holland, the two countries forming the kingdom of the Netherlands. In 1830 Belgium was separated from Holland and became a distinct kingdom, forming a constitutional monarchy. Prince Leopold of Saxe-Coburg was elected its first king, in 1831, with the title of Leopold I. He was succeeded after a prosperous reign of thirty-four years by his son, Leopold II., who gave support to the explorations of Stanley in Central Africa, and consistently opposed the maintenance of slavery in that region. The Congo International Congress held at Berlin made his government the controlling influence in the Congo Free State, Belgium reserving the right of annexation after 1900. Albert I., the present king, born April 8, 1875, son of the Count of Flanders, the brother of Leopold II., succeeded to the throne in 1909. He married Princess Elizabeth of Bavaria in 1900. At the beginning of the Great European War, in 1914, the Germans invaded Belgium, captured Brussels and Antwerp, and took possession of almost the entire country before the end of the year. After the defeat of the Central Powers, in 1918, the country was restored to the Belgians. Crown Prince Leopold, in 1926, married the Princess Astrid of Sweden.

BELGRADE (bĕl-grād'), the capital of Servia, called by the Turks "the House of the Holy War," at the junction of the Save and the Danube Rivers. It is on several railroads and has electric street railways. The chief buildings include the cathedral, the public library with 100,000 volumes, the national theater, the royal palace, and a number of fine churches. It has water works, electric lights, pavements, a considerable trade, and numerous manufactures. Several fine gardens and drives beautify it, and statuary adorns its public places, among them the statue of Prince Michael III. The Greeks were in possession of Belgrade until 1073, when it was captured by the Hungarians. Later it fell into the hands of the Bulgarians, Servians, Austrians, French, and Turks. In 1862 it became the capital of Servia, and was finally evacuated by the Turks in 1867. The Treaty of Berlin, in July, 1878, after the close of the war between Russia and Turkey, recognized Servia as an independent state. Belgrade was captured by the Austrians in 1914. The city is fast losing its Turkish appearance and partaking of European characteristics. Population, 1922, 92,890.

BELIEF (bē-lēf'), the mental act or operation of accepting as true and real any proposition on proof afforded by reasoning, or any alleged fact or opinion on evidence of testimony. It stands in opposition to the conviction that results from personal observation or experience, which is stronger than that resting on testimony or reasoning. The term *belief* is also used to express unwavering acceptance of anything as true.

BELISARIUS (bĕl-ĭ-sā'rĭ-ŭs), eminent general, born in Illyria in 505; died March 13, 565. Justinian I., Emperor of Byzantium, gave him chief command of the army in Asia, and in 530 he defeated the Persians at Dara. Two years later he suppressed an insurrection against Justinian at Constantinople, and defeated the Vandals in Africa and took Gelimer, their king, a prisoner in 534, for which he received a triumphal procession on returning to Constantinople. He was made consul in 535, and subsequently commanded in wars against the Bulgarians and Ostrogoths. His enemies preferred against him a charge of treason and he was put in prison, but after six months was released and restored to his honors. Writers accord him distinction for loyalty and humanity.

BELIZE (be-lēz'), the capital of British Honduras, Central America, located on Honduras Bay, at the mouth of the Belize River. It is the center of a growing import and export trade in rosewood, cedar, logwood, mahogany, sugar, cocoanuts, and other tropical productions. The city is well built. It has extensive telegraph connections, a good harbor, and several fine schools and churches. Population, 1921, 10,580.

BELKNAP (bĕl'năp), **George Eugene,** rear-admiral, born at Newport, N. H., Jan. 22, 1832; died in 1903. He entered the navy as a midshipman in 1847, and commanded the *New Ironsides* during the larger part of the Civil War. Subsequently he made deep-sea soundings between the United States and Japan for a route of a submarine cable across the Pacific. In 1885 he was made commodore, and the same year became superintendent of the United States Naval Observatory.

BELKNAP, William Worth, soldier, born near Newburgh, N. Y., Sept. 22, 1829; died Oct. 13, 1890. He studied at Princeton College and began the practice of law at Keokuk, Iowa. In 1861 he entered the Union army as major of volunteers, and distinguished himself in the campaign conducted by Sherman at Atlanta. President Grant made him Secretary of War for both of his administrations. In the last term he was impeached for receiving bribes, but the proceedings were dropped by the Senate after his resignation.

BELL (bĕl), an instrument for producing a ringing sound, made chiefly of a kind of bronze called *bell metal.* It consists of a reversed cup, at the apex of which an ear or canon is formed, used for suspending it from a beam or some fixed body above. On the inside is a hammer or clapper, which generates the sound by percussion on the reversed side of the cup. In

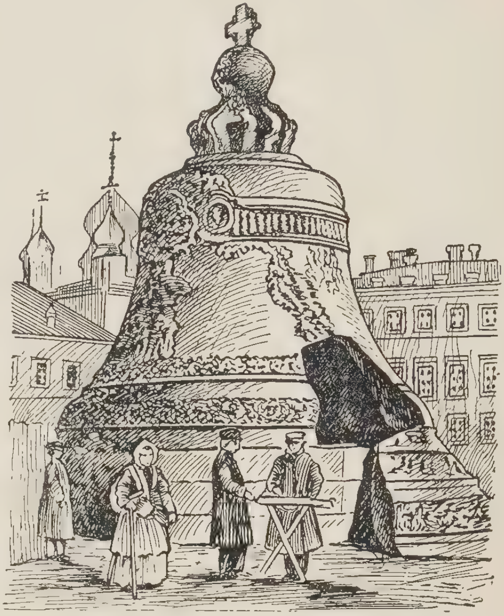
Exodus xxviii, 33-34, golden bells are mentioned in connection with worship. The antiquity of bells is also shown by the discovery of Sir Austin Layard (1819-94) at the site of the ancient city of Nineveh, where he secured bells made of one part tin and ten parts copper. In Greece and Rome bells were used, not only in religious observances, but were common at the markets, camps, and baths. Those made at an early date were of a comparatively small size until about the year 400 A. D., when the Bishop of Nola introduced the use of larger sizes in Campania. Their use in England began in the 7th century, and they were first cast in that country about 940, but in Ireland and Scotland they were probably used at an earlier date. The great bell of Saint Paul's Cathedral in London was cast in 1882. It has a diameter of 9.07 feet and weighs 35,470 pounds. The bell of Westminster, known as Big Ben, was cast in 1856 and has a weight of 30,324 pounds.

Bells are now in common use in churches, either singly or in a series, and are employed extensively in city buildings, at private houses, and in offices and hotels. Some bells are famous in history on account of their large size, beauty, and clearness, or some important historic event announced by their ringing. Among the most famous are the following:

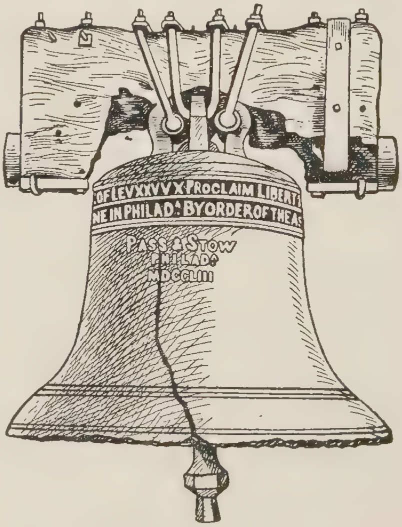
WHERE LOCATED.	WEIGHT IN TONS.	WHEN MADE.
Cologne, Germany	11	1448
Halberstadt, Germany	8	1457
Rouen, France	16	1501
Breslau, Germany	11	1507
Lucerne, Switzerland	8	1680
Paris, France	15	1680
Vienna, Austria	18	1711
Moscow, Russia	216	1736
Montreal, Canada	14	1847

Several of these bells have been recast, notably the Keiserklocke at Cologne, in 1875, which now weighs twenty-five tons. The great bell of Moscow is the largest ever made, and hung suspended only a short time, owing to a fire. It now serves as a dome to a chapel that was excavated below it. The famous Liberty Bell, which rung when the Declaration of Independence was issued in 1776, was made in 1751. Montreal, Canada, has the largest bell in America, weighing thirteen and a half tons.

The material used chiefly in making bells, known as bell metal, consists of an alloy of tin and copper with a little zinc and lead added. In England and Germany good results have been secured by casting bells of cast steel. Glass has been used with excellent results as to tone, but durability is wanting. Bells are cast in molds made of fine sand. The molten metal is drawn off from a great furnace into an earthen or crucible pot, which is swung by a crane. The molten metal is poured over the mold into a pit beneath the floor of the foundry. When the bell has been cast, it is drawn out of the pit and its rough places are finished with files and chisels. The size of the bells and their thickness depends upon the purpose they are to serve. The small bells are proportional in weight to the larger ones, and are rung by means of ropes, which cause them to swing to and fro. Others are struck by hand, and some by means of a hammer on the outside. *Curfew bells* are rung in some towns to warn the people that it is time to retire, *fire bells* give warning of and indicate the location of fire, and *church bells* call to service, or toll the announcement that death has visited the com-



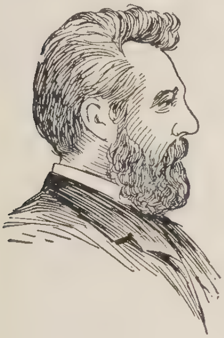
GREAT BELL OF MOSCOW.



LIBERTY BELL, PHILADELPHIA.

munity. Many churches in the larger cities have chimes, which consist of a set of bells, and the sounds produced are pleasing and musical. The most recent inventions in bells include electrical contrivances, such as are used for danger signals and to call attendants in hotels and offices. They provide both rapidity and convenience at short and long distances. Bells of this kind are constructed of two electro-magnets, provided with an armature, to which a clapper is fixed that vibrates between two gongs. When an alternating current is generated, the attraction and repulsion of the armature causes the bell to ring.

BELL, Alexander Graham, scientist and inventor, born in Edinburgh, Scotland, March 3, 1847. He was educated at the high school and the University of Edinburgh and came with his father to Canada, making his home at Brantford. His father, Alexander Melville Bell, was the inventor of a system of instruction for deaf mutes, which the son introduced in America. He became professor of vocal physiology at the Boston University in 1872, and while there invented the telephone. His invention was first exhibited in Philadelphia in 1876, but since then many improvements have been made to bring the telephone to its present state of efficiency. In 1880 he and Taintor introduced the *photophone,* an instrument in which a vibratory beam of light takes the place of a wire in conveying speech. The *graphophone,* an instrument to reproduce the human voice and similar to the Edison phonograph, was also invented by him. He wrote extensively on electricity and attained to prominence as a member of many scientific societies. He gave over $60,000 to establish the periodical *Science,* was a regent of Smithsonian Institution and founded the Volta Bureau. He died Aug. 2, 1922. See **Telephone.**



ALEXANDER G. BELL.

BELL, Andrew, clergyman, born at Saint Andrews, Scotland, in 1753; died at Cheltenham, Jan. 27, 1832. He studied at the Saint Andrews University, and in 1789 went to India, from whence he originated the "Monitorial System of Education," which, as the name implies, utilizes some of the advanced pupils of the school or system of schools to aid in giving instruction. Besides writing on educational subjects, he lectured extensively, and at his death left $600,000 for the establishment of schools in the British Isles. He was buried at Westminster Abbey.

BELL, Sir Charles, surgeon, famous for his discoveries in the nervous system, born at Edinburgh, Scotland, in 1774; died near Worcester, April 29, 1842. He was admitted as a member to the Edinburgh College of Surgeons, and later became one of the surgeons of the Royal Infirmary. To gain practical knowledge of gun-shot wounds, he visited the Battle of Corunna in 1809 and the Battle of Waterloo in 1815. He published many works on different phases of anatomy and surgery. The following is taken from his epitaph: "Sacred to the memory of Sir Charles Bell, who, after unfolding with unrivaled sagacity, patience, and success the wonderful structure of our mortal bodies, esteemed lightly of his greatest discoveries, except only as they tend to impress himself and others with a deeper sense of the infinite wisdom of the ineffable goodness of the Almighty Creator."

BELL, Henry, engineer, born in Linlithgow, Scotland, April 7, 1776; died Nov. 14, 1830. He took up the business of a millwright and later studied ship modeling. Subsequently he made a study of mechanics at Bell's Hill and conducted experiments with the steam engine. In 1812 he supervised the construction of a small vessel called the *Comet,* which was launched on the Clyde. This vessel had a three horse power engine and was the first European boat in which steam was used as power.

BELL, John, statesman, born at Nashville, Tenn., Feb. 15, 1797; died Sept. 10, 1869. After practicing law successfully, he became a member of the State Senate, and in 1827 was elected to Congress from Tennessee, serving till 1841. He was speaker of the House from 1835 until 1837. In 1841 he was chosen by President William Henry Harrison as Secretary of War, and in 1847 elected Senator from Tennessee, which position he held until 1859. Politically he was a Whig. In 1860 he became the candidate of the Constitutional Union party with Edward Everett for Vice President, and received the electoral votes of three states.

BELL, Robert, surveyor and geologist, born in Toronto, Canada, June 3, 1841. He attended school in Prescott County and studied at McGill and Edinburgh universities, and in 1881 became a member of the American Institute of Mining Engineers. He joined the geological survey of Canada in 1857, and devoted nearly fifty years to making geological and topographical surveys in the Dominion of Canada. Among his important surveys are those of the south coast of Baffin Land, the great rivers of Northwestern Canada, and many of the lakes, including Lake Winnipeg, Great Slave Lake, and Lake of the Woods. The Bell River, a branch of the Nottaway, which flows into James Bay, was named after him. He published several hundred reports relating to geology, geography, and folklore. In 1888 he was a royal commissioner on the mineral resources of Ontario.

His surveys and reports are basic and important records.

BELLADONNA (bĕl-lȧ-dŏn′nȧ), or **Deadly Nightshade,** a plant native to Eurasia, but some species are now cultivated successfully in America. It is widely distributed over Europe, where it grows wild in forests, near fences, and in waste places. The berries are shining black and, like all parts of the plant, are very poisonous. Vinegar is an antidote to counteract the effects of this poison. The plant attains a height of four or five feet. Its leaves, roots, and fruit are used in making medicine, which is useful in palsy, fevers, epilepsy, and other ailments. Some species are beautiful flowering plants.

BELLAIRE (bĕl-âr′), a city of Belmont County, Ohio, five miles from Wheeling, W. Va., on the Ohio River. It is on the Pennsylvania, the Baltimore and Ohio, and other railroads, and is important as an industrial and commercial center. Its has a public library and several fine school and church buildings. The manufactures include window glass, pig iron, farm machinery, nails, hardware, cigars, and clothing. Gas and electric lights, pavements, waterworks, and street railways are among the improvements. In the vicinity are extensive deposits of coal, clay, and limestone. Population, 1900, 9,912; in 1920, 15,061.

BELLAMY (bĕl′ȧ-mĭ), **Edward,** writer and journalist, born at Chicopee Falls, Mass., March 26, 1850; died May 22, 1898. His education was received at Union College and in Germany, after which he was admitted to the bar. In 1871-72 he was connected with the New York *Evening Post,* and later with the *Springfield Union.* He is the author of "Looking Backward," of which about four hundred thousand copies were sold in America within a few years after its publication. In it is given a picture of the idealistic effects of socialism, of which theory he was an advocate. Several communities based on the doctrine of socialism were founded by him. He published "Dr. Heidenhoff's Process," "Six to One," "Miss Luddington's Sister," and "Equality." In 1898 he visited Colorado with the view of recuperating his health, but returned to his native State without being materially benefited, and soon after died at his home in Chicopee Falls.

BELLBIRD, a bird native to South America and the West Indies, so named from the metallic sound of its voice, which resembles the tolling of a bell. The bill is broad and depressed and flexible at the base, and at the upper side is a tubular appendix about three inches in length. This hornlike growth stands erect when the bird becomes excited, or when it utters its note. A similar bird in found in Australia and New Zealand.

BELLEFONTAINE (bĕl-fŏn′tān), a city in Ohio, county seat of Logan County, forty-five miles northwest of Columbus, on the Ohio Central and other railroads. It is located on the highest ground in the State. The chief buildings include the county courthouse, the high school, and several churches. Railroad machine shops, flouring mills, and carriage works are among the chief manufacturing establishments. It has a growing trade in farm produce and merchandise. The waterworks and lighting plants are municipal properties. The first settlement was made in 1818. Population, 1920, 9,336.

BELLE ISLE, an island north of Newfoundland, at the northern extremity of the Strait of Belle Isle. Much of the surface is rocky. The area is about fifteen square miles. At the southern extremity is a lighthouse 470 feet high. The Strait of Belle Isle separates Newfoundland from Labrador, and is the connecting link between the Atlantic and the Gulf of Saint Lawrence.

BELLEROPHON (bĕl-lĕr′ȯ-fŏn), the son of Glaucus, King of Corinth, and the slayer of Chimaera. It is related that he killed Bellerus and fled for protection to the King of Argos, who sent him to the King of Lycia with a sealed letter requesting that he kill Bellerophon, but that king decided that he should fight with Chimaera, a fire-breathing monster. He mounted the winged horse Pegasus, and while in midair slew the monster and defeated the Amazons. Sophocles and Euripides made the myth of Bellerophon the subject of tragedies.

BELLEVILLE (bĕl′vĭl), a city in Illinois, county seat of Saint Clair County, about fourteen miles southeast of Saint Louis, on an elevated district in the midst of a fertile farming country. It is on the Southern, the Illinois Central, and the Louisville and Nashville railroads. The city is a prosperous commercial and manufacturing center, and has modern municipal facilities, and adjacent to it are productive coal mines. Its manufactures consist of ironware, woolen goods, stationery, brick, clothing, flour, and machinery. It has a public library, the Saint Peter's Cathedral, a fine courthouse, and a convent for the education of young ladies. The municipal improvements include electric street railways, brick and macadam pavements, and waterworks. The first settlement was made in 1814 and it was incorporated in 1846. Population, 1920, 24,741.

BELLEVILLE, a city in Ontario, Canada, county seat of Hastings County, on the Canadian National and Canadian Pacific railways. It is on the Bay of Quinte, at the mouth of the Moira River, and is an important commercial center. The manufactures include ironware, clothing, cement, locks, paper, alcohol, and dairy products. It is the seat of several educational institutions, including an asylum for the deaf and dumb and Albert University, founded in 1857. The principal improvements include waterworks, sewerage, and street pavements. Population, 1901, 9,117; in 1921, 12,163.

BELLEVUE (bĕl-vū), a city of Kentucky, in Campbell County, on the Ohio River, opposite Cincinnati, Ohio. It has a growing trade, is improved by good municipal facilities, and has several fine schools and church buildings. Many Cincinnati business men reside here. It was incorporated in 1871. Population, 1900, 6,332; in 1920, 7,379.

BELLINGHAM (bĕl'ĭng-am), a city in Washington, county seat of Whatcom County, ninety-eight miles north of Seattle, on the Northern Pacific, the Great Northern, and other railroads. It is located on Bellingham Bay, an inlet from the Gulf of Georgia, and has a large coastwise trade. The harbor is safe and well improved. It is important as an export market for merchandise and produce. Sawmills, canneries, creameries, milk condensing, and machine shops are among the leading manufacturing enterprises. The trade is largely in fruit, cereals, live stock, fish, and products from the farm and dairy. Coal mines, and stone quarries are operated in the vicinity, and the surrounding country is devoted to farming and fruit culture. It is the seat of a State normal school and has a public library, a substantial courthouse, and numerous schools and churches. The public improvements include a library, waterworks, and electric street railways. Settlements were made in the vicinity in 1858 and the town was named Whatcom. Bellingham dates from 1903 when Fairhaven and Whatcom were united to form the city. Population, 1908, 11,062; in 1920, 25,570.

BELLINI (bĕl-lē'nē), **Jacopo,** eminent painter, born in Venice, Italy, in 1395; died in 1470. He and his two sons, Giovanni and Gentile, are regarded the founders of the Venetian school of painting. The two sons did much to make oil painting popular. Giovanni Bellini (1426-1516) and Gentile Bellini (1427-1507) are names well known in the history of painting.

BELLINI, Vincenzo, famous composer, born at Castania, Sicily, Nov. 3, 1802; died near Paris, France, Sept. 24, 1835. He studied composition at Naples under Zingarelli, wrote operas before reaching the age of twenty, and was patronized by the principal musical establishments of Europe. His operas include many productions filled with sweet melodies, among them "La Sonnambula," "Norma," "El Pirata," and "I Puritani."

BELLMAN (bĕl'män), **Karl Michael,** lyric poet, born in Stockholm, Sweden, Feb. 4, 1740; died Feb. 11, 1795. He was the son of a professor at Upsala, where he studied for some time, and subsequently took up literature. Gustavus III. gave him financial aid and moral encouragement, but he suffered from ill health. His poems are pathetic and remarkable for joyous melody. They express the joy of life and have been published extensively. "The Temple of Bacchus" is his longest poem. His more important writings were collected in 1790 and published under the title of "Letters to Fredman."

BELLONA (bĕl-lō'nȧ), the Roman goddess of war, sometimes confounded with Minerva. Her temple stood in the Campus Martius, near the circus of Flaminius, and was of great importance in the time of the republic. The 24th day of March was set aside for her worship.

BELLOWS (bĕl'lŭs), a machine or instrument for producing a blast of air, used principally for blowing fires in furnaces, forges, and mines, or for filling pipe organs. It was used by the ancients, both nomadic and civilized. The common bellows are made by joining two wooden sides together with leather stretched entirely around, and so fastened that two handles moved back and forth cause air to be forced out through the nozzle. A valve on the side admits the air as the handles are moved apart, but closes when brought together. This results in the air being driven out with much force. More powerful instruments designed for factories or workshops are provided with machinery to obtain propulsive force. In the larger industrial establishments where large quantities of coal are burned fan-blast machines are used for the same purpose. They have the advantage of furnishing a continuous current of air.

BELL ROCK, or **Inch Cape,** a reef of rocks in the North Sea, opposite the mouth of the Tay, about twelve miles from Arbroath, Scotland. The danger of this reef to navigation has been partly overcome by the erection of a large lighthouse, in 1810, under the direction of Robert Stevenson. The lighthouse is 120 feet high, has an alternating red and white revolving light, and is enforced by the ringing of two bells during storms. The reef, which is about 2,000 feet long, is partly uncovered at spring tides.

BELMONT, August, financier, born at Alzey, Germany, in 1816; died in New York City, Nov. 24, 1890. He was educated at Frankfort and was employed by the Rothchilds as their agent in New York. In 1844 he was made consul general at New York by the government of Austria, and subsequently served as American minister to Holland. He was chairman of the national Democratic committee for twelve years, beginning in 1860, and during the Civil War was of great assistance to the United States by furnishing valuable information to the government, and in a large measure preventing the Confederacy from floating loans in the foreign money market.

BELMONT, August, financier, born in New York City, Feb. 18, 1853. He succeeded his father, August Belmont, in the management of the banking house of August Belmont & Co., American representatives of the banking firm of the Rothchilds, and became an officer and director of many corporations interested in railroads and manufacturing. In politics he affiliated with the opponents of Bryan in 1896, and was influential as a Democrat in State and national organizations. He has held important offices in the company that controls the consolidated traction lines of New York City. He died Mar. 29, 1919.

BELOIT (bê-loit'), a city of Rock County, Wisconsin, on the Rock River, about forty-seven miles southeast of Madison, on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads. It is the center of a fine agricultural country and the seat of large factories engaged in the construction of paper, engines, grinding machines, boots and shoes, engines, and machinery. Besides having good public schools, it is the seat of Beloit College, a well established institution of higher learning under the direction of the Congregationalists. The chief buildings include the public library, the city hall, and the central high school. Gas and electric lights, street railways, and waterworks are among the municipal improvements. It was first settled in 1824 and became an incorporated town in 1856. Population, 1905, 12,855; in 1920, 21,284.

BELSHAZZAR (bĕl-shăz'zar), the last king of the Chaldean dynasty, who, according to some historians, ruled conjointly with his father, Nabonidus. His death occurred in 538, when Cyrus, King of Persia, conquered Babylon. For an account of the circumstances of his overthrow see the Book of Daniel.

BELT, or **Belting,** in machinery, an endless flexible cord or band used to transmit power or motion between two parallel shafts. Driving belts are usually broad or flat bands of leather or rubber, but there are a vast number of forms made of different materials, such as ropes, chains, and cables, which are used to transmit power from one roller, wheel, or pulley to another. The best leather belts are made of oak-tanned leather, cut from the back of hides and curried in tallow and cod oil. Under suitable care and with proper connections, belts of this kind can be used to drive machinery from twenty to thirty years. India rubber is preferred as a material for belting by a number of manufacturers, as it does not absorb moisture or stretch and decay, but its tendency to deteriorate with age makes it less durable. Iron and steel wire and chains are used extensively, but they require a peculiar construction of pulleys. A variety of woven-fabric belts are employed, including hair, cotton, and various textile fabrics, though in general they are most serviceable in smaller machinery. The two ends of a belt may be united together by riveting, or by clamps of various construction, and in the lighter class of belting it is customary to lace the ends together with a strap of leather. Where great power is transmitted, it is necessary to have leather belts of several thicknesses, frequently as much as four layers, and the width ranges from twenty to fifty inches. Heavy rubber belting is sometimes six-ply thick, from thirty to fifty inches wide, and about 300 feet long, depending, of course, upon the construction of the machinery and the power to be transmitted.

BELT, Great and Little, the names of two narrow channels which connect the Baltic Sea with the Cattegat. The Great Belt is thirty-seven miles long and about eighteen miles wide, and passes between the islands of Fünen and Zealand. It has dangerous shoals and sand banks, and a swift current prevents the strait from being frozen over except in very severe winters. The Little Belt separates Fünen from Jutland. It is thirty miles long and from one to twelve miles wide, and in general respects resembles the Great Belt.

BELUCHISTAN. See **Baluchistan.**

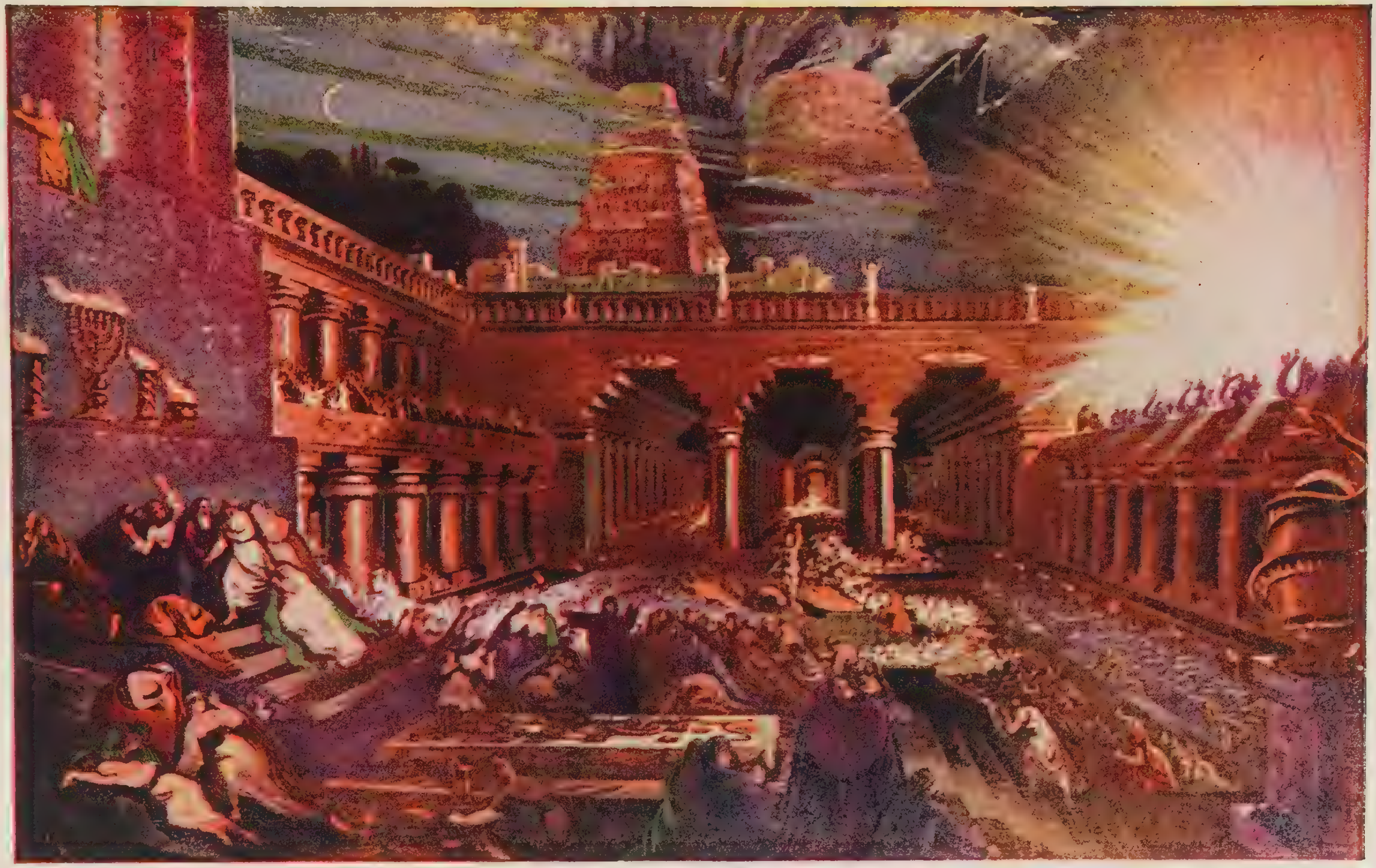
BELTEIN (bĕl'tân), or **Beltane,** a festival common among the Celtic people in former times, which was celebrated annually in the beginning of May down to the early part of the 19th century. Some writers have associated it with fire worship or with the worship of the sun, while others regard it a season for burning rubbish at the time of cleaning house yards. In some localities festivals known by this name were celebrated in the month of November.

BELUGA (bê-lū'gȧ), or **White Whale,** a kind of whale or dolphin found in the Arctic Sea. It has a broad head and is from ten to fifteen feet long, and is hunted for its skin and oil, known as *porpoise oil.* The sturgeon of Southern Russia is known as beluga, and is hunted for its flesh and a kind of isinglass obtained from it.

BELVIDERE (bĕl-vĭ-dēr'), a city of Illinois, county seat of Boone County, on the Kishwaukee River, seventy-six miles northwest of Chicago, on the Chicago and Northwestern Railroad. A public library, an opera house, and the county courthouse are among the chief buildings. The manufactures include flour, farming implements, and machinery. The city has several fine churches and schools, waterworks, and an electric system of lighting. It was settled in 1836 and incorporated in 1857. Population, 1900, 6,937; in 1920, 7,760.

BELZONI (bĕl-tsō'nê), **Giovanni Battista,** explorer, born in Padua, Italy, Nov. 5, 1778; died Dec. 3, 1823. He emigrated to England in 1803 and subsequently went to Egypt at the invitation of Mehemet Ali, for whom he made a hydraulic machine. While in Egypt he explored the antiquities at Gizeh and in the region between the Nile and the Red Sea. He secured a colossal bust of Rameses II., now in the British Museum, and opened one of the pyramids of Gizeh. He published "Operations and Discoveries in Egypt and Nubia."

BEM (bĕm), **Jozef,** revolutionist and patriot, born in Galicia, Austria. in 1795; died Dec.



BELSHAZZAR'S FEAST

(Opp. 272)

10, 1850. He joined the French under Napoleon, and subsequently entered the Polish army. In 1884 he took command of the army of Transylvania, consisting of 10,000 men. He was at first unsuccessful, but later defeated the Austrians at the bridge of Piski, and in 1849 repulsed them and their Russian allies. However, he was defeated at Schässburg in 1849, and was compelled to retreat into Transylvania. He obtained a command in the Turkish army. In 1850 he suppressed an insurrection of the Arabs at Aleppo, and soon after died of a fever.

BEMBA. See **Bangweolo.**

BEMIDJI, county seat of Beltrami County, Minnesota, 180 miles northwest of St. Paul, on Bemidji Lake and on the Northern Pacific and other railroads. Among the features are the city hall, court house, high school, public library, and saw mills. It has a large trade. The place was settled in 1889 and incorporated in 1896. Population, 1920, 7,086.

BENARES (bĕn-ä'rĕz), a city in the northern part of India held sacred by the Hindus. It is the focus of a network of railroads, on the Ganges River, which makes a turn at this place. The site on which the city is built rises like an amphitheater, thus presenting a magnificent view of its beautiful palaces, mosques, and other buildings. The city is the residence of many priests. Vast numbers of religious mendicants and Hindu pilgrims wend their way to this revered city to worship in its ancient edifices, or to temporarily wash away their sins in the sacred waters of the Ganges. Historically sacred bulls wander at large to indicate the sacredness of the city. There are no less than 1,500 Hindu temples within the city limits, besides 275 Mohammedan mosques. Benares is surrounded by a fertile district and has a large trade in merchandise. The manufactures include utensils, embroidered cloth, clothing, shawls, silk, jewelry, and other Eastern products. A portion of the city is occupied by Europeans, who founded a government college which is now attended by about 1,250 students. They constructed a beautiful bridge across the Ganges River, containing sixteen spans. Little is known of the early history of the city. According to Hindu tradition it was founded at the time of the creation. Population, 1921, 225,173.

BENDER (bĕn'dĕr), or **Bendery,** a town of Russia, in the government of Bessarabia, sixty miles northwest of Odessa. It is located on the Dniester River, fifty miles from its mouth, and has a large trade in grain and live stock. The manufactures embrace machinery and clothing. A fine Greek church, a gymnasium, and the government buildings are its chief improvements. Many of the people are Jews and Armenians. Russia captured it in 1770, but it was ceded to Turkey in 1774, and in 1812 it was finally given to Russia by the Peace of Bucharest. Population, 32,350.

BENEDICT (bĕn'ḗ-dĭkt), the name of fourteen popes, who ruled within 574 and 1750. They were more or less distinguished, but Benedict XIV. was the most celebrated. This pontiff was born at Bologna in 1675 and died May 3, 1758. He was distinguished for extensive learning, piety, and tolerance, and his doctrines were exemplified in his practice. It was his anxiety that the clergy should be untainted in morals. To attain this object he established a board of examiners for all candidates to vacant sees. His manner was frank and his intercourse with strangers showed a high degree of kindness, whatever the nature of their religious opinions. Among his written works are "On the Sacrifice of the Mass," "On the Beatification and Canonization of Saints," and "On the Diocesan Synod."

BENEDICT XV., Pope of Rome, born at Genoa, Italy, Nov. 21, 1854. He studied at the University of Genoa, where he graduated in law in 1875, and later studied theology at Capranica College. After serving as prelate at Madrid, Spain, he was made archbishop at Bologna. In 1914 he succeeded Pius X. as pope, well equipped by training and by nature for this position. His policy in the Great European War was in the interest of peace. He died Jan. 22, 1922.

BENEDICTINES (bĕn-ḗ-dĭk'tĭns), an order or society of monks who observe the rules of Saint Benedict. It dates from 529, when Saint Benedict founded the first monastery of this order on Monte Cassino, near Naples. The rule of living requires that its members be industrious, avoid laughter, take the vow of poverty, and exercise frugality in living. They teach the trades and industries, especially weaving, dyeing, tanning, glass-blowing, sculpturing, masonry, and other industrial and fine arts. In the Middle Ages the Benedictines were concerned in the preservation of the ancient classics, and through them many art and literary treasures have been transmitted to modern times. The monks of this order include many scholars and learned men noted for their piety and interest in disseminating knowledge. The order lays claim to the distinction that twenty-four of its members became popes; 200, cardinals; and 4,250, bishops.

BENEFIT ASSOCIATIONS, or **Fraternal Societies,** the organizations whose aims include the cultivation of social relations, the assistance of members during the time of sickness and disability, and the payment of benefits in case of death. Their business, so far as it pertains to life insurance, is conducted on an assessment basis, classified in accordance with the age of the assured. They are particularly numerous in the United States, where the annual income of this class of fraternal societies is about $230,000,000, while the expenditures are about $169,000,000. The largest among these are the Modern Woodmen of America and the Woodmen of the World (Sovereign Camp).

About 200 of these organizations are operating in Canada and the United States. A comparatively large business is transacted in Canada, where they are generally termed *friendly societies,* and many are established by the workingmen themselves. Although life insurance is issued by the societies named below, it is not strictly compulsory. A member may belong to and enjoy all the privileges of many of them without carrying life insurance, and under such circumstances his privileges are fraternal and for personal edification. These associations have been a source of benefit to many homes on account of the payment of small life policies, and because of the friendship and acquaintance of friends of deceased members. Below is a complete list of benefit associations whose outstanding insurance totaled over $46,300,000 on Jan. 1, 1926.

Name of Society	Insurance in Force Jan. 1, 1926
Modern Woodmen of America	$1,701,767,000
Woodmen of the World (Sovereign Camp)	624,028,554
Travelers Protective Association	594,475,000
United Commercial Travelers of America	559,095,000
Royal Neighbors of America	450,830,750
Brotherhood of Railroad Trainmen	326,422,675
Knights of Columbus	258,592,464
Security Benefit Association	242,162,944
Woodmen of the World (Denver, Col.)	224,104,400
The Maccabees	193,344,796
Locomotive Eng. Mut. L. and A. Ins. Ass'n.	186,030,750
Woman's Benefit Association	185,040,031
Royal Arcanum	172,550,125
Brotherhood of American Yeomen	165,476,687
American Insurance Union	160,409,180
Brotherhood of Loc. Firemen and Eng'men	156,388,000
Independent Order of Foresters	149,127,369
United Am. Mech., Jr. Order, F. B. Dept.	130,833,000
Woodmen Circle	129,382,430
Knights of Pythias (Insurance Dept.)	121,538,568
Catholic Order of Foresters	120,040,988
Protected Home Circle	115,651,180
Order of Railway Conductors	101,487,500
Polish National Alliance of America	98,662,350
Ladies Catholic Benevolent Association	81,962,381
Fraternal Aid Union	80,293,759
Neighbors of Woodcraft	80,251,400
Mystic Workers	76,187,197
Railway Mail Association	76,008,000
Supreme Tribe of Ben-Hur	66,855,998
Independent Order Brith Abraham	66,066,000
Degree of Honor Protective Association	60,348,850
Women's Catholic Order of Foresters	58,805,050
Massachusetts Catholic Order of Foresters	56,980,000
Polish Roman Catholic Union	56,637,400
Modern Brotherhood of America	53,054,525
Canadian Order of Foresters	52,925,187
Greek Catholic Union	50,869,250
German Beneficial Union	50,391,150
Modern Order of Praetorians	47,902,775
Aid Association for Lutherans	47,058,285
Croatian Fraternal Union of America	46,311,750

BENEVENTO (bā̇-nā̇-vĕn′tō̇), a city of Southern Italy, in a province of the same name, near the junction of the Sabbato and Calore rivers. It occupies the site of the ancient Beneventum, and is noted for its remains of antiquity. The famous arch of Trajan, built in 114 A. D., and its cathedral, constructed after the Lombard-Saracenic style in the 12th century, are among the most noted buildings. Population, 1921, 24,893.

BENGAL (bĕn-ḡa̤l′), the largest of the governmental divisions of British India, containing an area of 111,543 square miles. It constitutes a lieutenant governorship and, besides Bengal proper, includes Behar, Orissa, Chota Nagpur, and the tributary states. The tributary states have an area of 58,500 square miles. Bengal is located south of the Himalaya Mountains, and north of the Gulf of Bengal. Through it flow the Brahmaputra and Ganges rivers, two valuable water courses, which, below their confluence, form the greatest delta in the world. The glaciers of the Himalaya Mountains supply the two chief rivers of the district with immense volumes of water in the months of June and July, and cause a large region to be inundated similar to the inundations of the Nile. As a result of this the low lands of the delta are fertile and produce large quantities of cereals and fruits.

The mean temperature of Bengal for the year is about 80° near the coast, and in the elevated regions to the north it is about 54°. In the eastern part the rainfall is extremely large, averaging over 100 inches in a year, and is equaled only by the precipitation of the Amazon valley and the lake region of Africa. Three seasons make up the year, including the hot, from March to June; the rainy, from June to October; and the cold, from October to March. The district is generally unhealthy for Europeans on account of its variations in moisture and temperature. Along the coast extend great trackless forests, in which the Bengal tiger and the rhinoceros are numerous. Many reptiles and carnivorous animals infest the swamps and canebrakes of the low and marshy coast and the delta. The district is frequented by destructive floods and occasionally by cyclones, while earthquakes have visited it at numerous times. Among the chief products are opium, cane sugar, tobacco, indigo, cotton, rice, and many varieties of tropical fruits. In the northern portions, adjacent to the foothills of the Himalayas, are extensive deposits of copper, petroleum, and coal, while salt beds are common in various parts of that region. A large commerce is carried on with Great Britain, China, Germany, the United States, and the Straits Settlements.

The first British settlement in Bengal was made by the East India Company in the early part of the 17th century. Calcutta was founded in the latter part of that century, and is the largest city and most important commercial center of British India. Large additions of territory were made subsequently by conquest, and the country became a crown province in 1858. It is the most highly developed district of British India, and has made material advancement in educational arts and sciences. At Calcutta several colleges and a fine university have flourished for many years. The district has a well organized system of public schools, at which the fundamental arts of an education and higher instruction are given free of tuition. A number of industrial, professional, and denominational institutions are in a flourishing condition. Bengal contains many cities and is penetrated by a network of telephone and telegraph lines. It has transportation facilities by the Indus, the Brahmaputra, and about 24,850 miles of railways. The dialect spoken chiefly is known as *Bengali*, but the people of some of the regions speak the *Hindi* and *Uriya* dialects. The inhabitants belong largely to the Hindu race, but along the river valleys the Burmese predominate. About one-third of the people affiliate with the Mohammedan religion and the remainder are Animists, Buddhists, and Christians. Population, 1921, 58,448,735.

BENGAL, Bay of, a part of the Indian Ocean, south of Asia, located between India and Farther India. It is visited by southwest monsoons in winter and northeast monsoons in summer. The Andaman and the Nicobar Islands are the chief land masses within the bay. It receives the inflow from the Ganges, Irawadi, and Brahmaputra rivers. The tides sometimes rise to the height of seventy feet where the shores are elevated. Rangoon, Calcutta, and Madras are the chief cities tributary to the Bay.

BENGALI (bĕn-ga̤'lê), a branch of the Aryan language spoken in Bengal and other parts of India. Calcutta is the chief center of influence among the people who speak this language. It is thought to be an outgrowth from the Sanskrit and bears to it about the same relation that the Romance languages have to Latin. About 45,000,000 people speak the language. It has an interesting literature and numerous periodicals are published in the Bengali.

BENGUELA (bĕn̲-gâ'lȧ), a district in the western part of Africa, one of the divisions of the Portuguese colony of Angola. It is situated in a mountainous section between Mossamedes and Loanda. It has deposits of sulphur, copper, and petroleum, and the region is considered rich in mineral wealth and fertility of soil. Benguela, the capital, is a market for rubber, coffee, and fruit. It was founded in 1617 and was long a center of the slave trade.

BENI (bâ'nê), a river of Bolivia, rises in the Bolivian Andes, and after a course of 900 miles unites with the Mamoré to form the Madeira. It is navigable about half its length, and provides direct communication for a large part of Bolivia with the Amazon.

BENIN (bĕn-ēn'), a district of Western Africa, in Upper Guinea. It is bounded by Dahomey, the Niger, and the Bight of Benin, an extension from the Gulf of Guinea. The soil is fertile and produces yams, cotton, fruit, and sugar cane. The region was discovered and partly explored by the Portuguese in 1484. It became a possession of Great Britain in 1897, when it was incorporated in the protectorate of the Niger coast called Nigeria.

BENJAMIN (bĕn'jȧ-mĭn), "son of the right hand," the youngest son of Jacob and Rachel. He was loved by Jacob most of all his children, and was especially beloved by his elder brother, Joseph. From him one of the twelve tribes of Israel descended, known as the Benjamites. They numbered 45,600 warriors when Joshua led the hosts into Canaan. The portion allotted to them was situated between the tribes of Judah and Ephraim, on the west side of the Jordan. After the reign of Solomon, the kingdom of Judah was formed of Judah and Benjamin. These two tribes constituted the principal part of the Jewish nation after the Babylonian captivity under Nebuchadnezzar. Saul, the first King of Israel, and the Apostle Paul were Benjamites.

BENJAMIN, Judah Philip, called "The brains of the Confederacy," born at Saint Croix, West Indies, Aug. 11, 1811; died in Paris, France, May 8, 1884. He was a descendant of Jewish parents, studied at Yale, and was admitted to the bar in 1834 at New Orleans, where he became a member of the law firm of Slidell, Benjamin & Conrad. In 1852 he was elected to the United States Senate as a Whig. While in office he went over to the Democratic party and was reëlected in 1857, but resigned when Louisiana seceded from the Union. He advocated the Kansas-Nebraska bill, but afterward held that the Dred Scott decision should be accepted as conclusive. He was appointed Secretary of State for the Confederacy by Jefferson Davis, which office he filled with exceptional ability. After the war he fled from Richmond to the Bahamas, and later to Liverpool. Subsequently he studied English law at Lincoln's Inn, was admitted to the bar at London, and in 1872 became counsel to the queen.

BEN LOMOND (bĕn lō'mŭnd), a mountain in the Grampian Highlands of Scotland, twenty-seven miles northwest of Stirling. It is on the east side of Loch Lomond and rises to an elevation of 3,192 feet. Duchary Water, a feeder of the Forth, has its source in Ben Lomond. On clear days a fine view may be had of the surrounding country, including Loch Lomond and the fertile plains of Ayrshire and Renfrewshire. Scott in his "Lady of the Lake" makes this mountain a place of prominence.

BENNETT, James Gordon, journalist and founder of the New York *Herald*, born in Scotland, Sept 1, 1795; died in New York City, June 1, 1872. He first studied to become a Roman Catholic priest, but gave up that purpose, and in 1819 emigrated to America, where he engaged in public teaching. Subsequently he lectured and contributed to various magazines and newspapers. In 1835 he founded the New York *Herald* as a one-cent newspaper, and issued it from a cellar basement, where he was proprietor, editor, and salesman. On account of his habits of industry and practical application to business the paper was made spicy and newsy, and contained much personal gossip and public criticism. It was the first daily newspaper that published reports of stock sales, financial reviews, and other features now common to the great daily publications. When steamship lines and telegraph connections were established, he secured correspondents in all countries and made the paper a great commercial success. His editorials were independent in politics, but he generally supported the Democratic party. He continued to edit the paper until his death.

BENNETT, James Gordon, Jr., son of the founder of the New York *Herald,* born in New York City, May 10, 1841. He became managing editor of the *Herald* in 1866, and at the death of his father succeeded him as editor, publisher, and proprietor. His enterprise in fitting out the *Jeanette* for an expedition to the North Pole gave his newspaper considerable prominence, as also did the aid given by him to the London *Daily Telegraph* for a relief expedition under Henry M. Stanley, in search of Livingstone, whose whereabouts in Africa were unknown. In 1883 he joined John W. Mackey in organizing the Commercial Cable Company for transatlantic service. The New York *Evening Telegram* and several other newspapers were founded by him. He died May 14, 1918.

BEN NEVIS (bĕn nē'vĭs), a mountain in Inverness-shire, Scotland. Its height is 4,406 feet, with a precipice of 1,500 feet on the northeast side. It is the highest eminence in the British Isles. In 1883 an observatory was erected on its summit, and subsequently a carriage road was established to its top.

BENNINGTON (bĕn'nĭng-ton), the county seat of Bennington County, Vermont, famous for the battle fought here in the Revolution. It is located on the Rutland and the Lebanon Springs railroad, thirty-one miles northeast of Troy, N. Y., and is a manufacturing center of considerable importance. The leading manufactures are woolen goods, hosiery, ironware, furniture, and machinery. The chief buildings include the county courthouse and several public schools. It has waterworks and a system of electric lighting. It is the seat of a soldiers' home, and near the city is a monument 300 feet high to commemorate the Battle of Bennington. This engagement took place on Aug. 16, 1777, when General Stark at the head of the "Green Mountain Boys" defeated a detachment of Burgoyne's army commanded by Colonel Baum. It resulted in the capture of public stores and 600 British prisoners, and a complete victory for the Americans. Before the battle the American commander made his well known statement, "We will bag the fox, or Mollie Stark will be a widow." A successful celebration of the centennial of the battle was held in 1877, at which the President of the United States, his Cabinet, and many prominent men took part. Population, 1920, 9,982.

BENOIT (bĕ-nwä'), **Pierre Leonard Leopold,** composer, born at Harlebeke, Belgium, Aug. 17, 1834; died March 5, 1901. He received a musical education at the Conservatory in Brussels, where he graduated with high honors in 1857, and afterward studied in Germany under Wagner and Liszt. Subsequently he filled a musical appointment in Paris and in 1867 became director of the Conservatory at Antwerp, in which institution he was director until 1899. He established a rich style of composition, and wrote many volumes on musical subjects.

BENSON (bĕn'sŭn), **Frederick William,** statesman, born at Saint Catherine's, Canada, August 2, 1849. He studied at Upper Canada College, Toronto, and the Royal Military College, at Sandhurst. In 1866 he served as a volunteer during the Fenian raids in Canada, and in 1877 rendered valuable military service in India. He commanded Egyptian cavalry in 1892-94 and subsequently in South Africa. In 1903 he was made director of transports and recounts.

BENTHAM (bĕn'tam), **George,** botanist, born near Portsmouth, England, Sept. 22, 1800; died Sept. 10, 1884. He was a nephew of Jeremy Bentham (q. v.) and studied law at Lincoln's Inn, but devoted his attention to botany. For some time he resided in France, where he catalogued many plants, and subsequently studied the flora of China and Australia. He was made president of the Linnaean Society in 1861. He joined Sir Joseph Hooker in publishing "Genera Plantarum," an exhaustive work on botanical science.

BENTHAM, Jeremy, jurist and philosopher, born in London, England, Feb. 18, 1748; died June 6, 1832. He attended Westminster School and in 1766 graduated at Queen's College, Oxford. Though admitted to the bar in 1772, he did not take up the practice of that profession, but instead gave his attention to the theory and philosophy of law. He was a student of reforms in legislation and government, advocated universal suffrage, and held to the view that utility is the test and measure of virtue. In 1776 he published "A Fragment on Government," a critical and well written essay, and soon after issued a work entitled "Introduction to the Principles of Morals and Legislation." Many reforms advocated by him were put into practice, but not until public sentiment had developed along the line of his views. Among his publications not mentioned above are "Treatise on Civil and Penal Legislation," "Poor Laws and Pauper Management," and "Theory of Penalties and Rewards."

BENTLEY, Richard, classical scholar, born in Yorkshire, England, Jan. 27, 1662; died July 14, 1742. He was of high standing in the Established Church and a minister of recognized ability. His training was obtained at Saint John's College, Cambridge. Subsequently he became headmaster of the Spalding Grammar School, later dean of Saint Paul's, and subsequently Bishop of Worcester. In 1700 he was chosen master of Trinity College, Cambridge. His reputation is based largely upon his movement in favor of more extensive research in the literature of the Greek Church and the instigation of a new era of criticism. He published "Dissertation upon the Epistles."

BENTON (bĕn'tŭn), **Thomas Hart,** statesman, born at Hillsboro, N. C., March 14, 1782; died at Washington, D. C., April 10, 1858. He was admitted to the bar of Tennessee in 1811, and became aid-de-camp to Andrew Jackson in the War of 1812, but owing to a disagreement, which resulted in a personal combat, he resigned. Subsequently he raised a regiment and was appointed colonel, and later made lieutenant by President Madison. After the war he moved to Missouri, founded the *Missouri Inquirer,* and was chosen United States Senator in 1820. His influence in public legislation was marked and effective. He advocated the Pacific railroad, favored the establishment of post roads, counseled a friendly policy with the Indians, opposed public deposits in national banks, and favored the adoption of gold and silver as a currency basis. His speeches on the money question are among the best delivered in the Senate. He represented his State in the United States Senate for thirty years. Among his writings are "Thirty Years' Views," "Abridgment of the Debates of Congress," and "An Examination of the Dred Scott Case."

BENTON HARBOR, a city of Michigan, in Berrien County, sixty miles east of Chicago, Ill. It is situated on the Saint Joseph River and has transportation facilities by the Peré Marquette and other railroads. The Benton Harbor Canal connects it with Lake Michigan, which is about one mile from the city, and steamers from all principal points on the Great Lakes enter its harbor. The manufactures include furniture, flour, machinery, and clothing. It has a growing trade in fruit, cereals, and merchandise. In the vicinity are mineral springs whose water has medicinal properties. Population, 1904, 6,702; in 1920, 12,227.

BENZENE (bĕn'zēn), or **Benzole,** a mineral fluid obtained from the distillation of coal tar and usually classed with the hydrocarbons. It is secured from a grade of oil that floats on water when coal tar is distilled. At about the freezing point of water it solidifies and forms a mass of crystals. It is a good solvent for fatty substances, hence is much used for cleaning purposes. It burns with a bright flame. Nitrobenzene is formed by mixing benzene with nitric acid. Aniline (q. v.) is made from nitrobenzene.

BENZINE (bĕn'zĭn), a liquid obtained from coal tar and petroleum, consisting of hydrocarbon. It is highly inflammable and nearly colorless, and has a peculiar but agreeable odor. It is used in the manufacture of gutta-percha and India rubber on account of its solvent powers. Benzine is also used in removing grease spots from clothing, for cleaning gloves, in the manufacture of paints and varnishes, and as a burning fluid.

BENZOIN (bĕn-zoin'), or **Gum Benjamin,** a resinous substance obtained from a tree native to Southern Asia and the East Indies. It is fragrant and is used in perfumery and in medicine. The trees that yield benzoin, of which there are several species, are cultivated, and the resin is obtained by making incisions in the bark. The Roman and Greek Catholic churches use it as incense.

BEOWULF (bā'ō-wulf), an epic poem of the Anglo-Saxons dating from the 8th or 9th century, the original manuscript of which is in the British Museum. The manuscript is imperfect and many points are obscure, but it is regarded the longest and most important writing in Anglo-Saxon literature. In it the adventures of Beowulf, an Anglo-Saxon hero, are recounted, particularly his defense and delivery of the Danish kingdom from the monster Grendel and his ferocious mother.

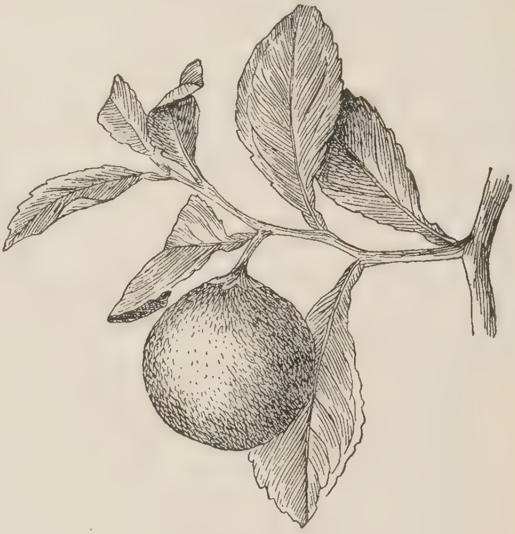
BERANGER (bā-rän-zhā'), **Pierre Jean de,** celebrated lyric poet, born in Paris, France, Aug. 19, 1780; died July 17, 1857. His early instruction was given by his grandfather, a tutor, and by his aunt. At the age of fourteen he became an apprentice printer, in which capacity he worked for three years. At Paris he aided his father, a loyalist, in questionable political schemes, but was himself an opponent of that party. Later he became so poor that he lived in a garret, where he devoted himself to the study of literature. At length his wants were so great that he was forced to seek aid. Lucian Bonaparte extended assistance in the form of a pension of one thousand francs, and five years later secured him a clerkship in the Imperial University. In 1815 he published a collection of poems directed against the Bourbons, which made him popular with the masses. This was followed in 1825 by another large collection, and in 1828 still another. Among these were some that met with serious opposition and led to his prosecution. He was accordingly imprisoned for nine months and a fine of ten thousand francs was placed upon him. However, his productions were so popular that many noted literary men came to visit him in prison, among them Dumas, Victor Hugo, and Sainte-Beuve. His last collection of poems was published in 1833. In 1848 his popularity was general, when he was elected to the assembly even against his wishes, with 4,471 votes. His life was full of wisdom and kindness, and his songs teem with wit and pathos, while through all his writings flows a vein of pleasantry. His memoirs were written by himself, and a treatise on "Social and Political Morality" was undertaken by him with the view of circulating it among the people, but, owing to physical weakness late in life, he was unable to complete it.

BERBERS (bĕr′bĕrz), the name of a historic people in Northern Africa, found mostly in the mountainous districts of Morocco, Algeria, and Tripoli, and in the northern part of the Sahara Desert. They are of middle stature, possess dark hair and dark, piercing eyes, and are austere in manner and cruel in disposition. Their life is largely pastoral, but they engage to a limited extent in hunting and trading, and in some districts follow agriculture and mining. They manufacture various rude implements for cultivating the soil, clothing, water mills, and implements of war. In government they are subject to the Turks in Tripoli, to the French in Algeria, and to the Sultan in Morocco, but large numbers are still unconquered, or live in tribes under independent chiefs. In early history they were conquered successively by the Phoenicians, Romans, Vandals, and Arabs. The predominating religion is Mohammedanism, and the spoken language is classed with the Hamitic tongues. Their peculiar characteristics show that they are a distinct and peculiar race. They number about 5,000,000. The four different classes of Berbers are known as the Amazirgh in northern Morocco; the Shulah in southern Morocco; the Kabyles in Algeria, and the Berbers in the Sahara Desert.

BERESFORD (bĕr′ĕs-fŏrd), **Charles William de la Poer,** naval commander, born in Philiptown, Ireland, Feb. 10, 1846. He attended private schools and in 1859 entered the royal navy. In 1868 he was made lieutenant, in 1875 became commander, in 1882 was made captain, and in 1897 rose to the rank of rear admiral. He was aid-de-camp to Queen Victoria in 1897. In the course of his naval experience he served in Asiatic and African campaigns and was four times elected to Parliament. In 1898 he went to China as representative of the Associated British Chambers of Commerce, visited the United States on the return trip, and while abroad made many important speeches on international questions. He published "Life of Nelson." He died Sept. 6, 1919.

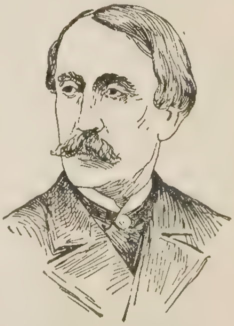
BERGAMO (bĕr′gȧ-mō), a city of Lombardy, in northern Italy, twenty-eight miles northeast of Milan. It is an important market and manufacturing center. The city consists of two sections, the upper and the lower, which are connected by a system of street railways. A fine statue of Garibaldi stands in Garibaldi Place. The public library contains 70,000 volumes. Other buildings include the city hall, the cathedral, and an academy of arts. In early history it was strongly fortified. It was destroyed by Attila in 452 A. D., and later became one of the chief cities of the Lombard kings. Population, 1921, 47,772.

BERGAMOT (bĕr′gȧ-mŏt), the name of a genus of fruit trees, including several species of pears and citrons. Bergamot oil is made of the citron, or bergamot orange. It is cultivated in Eurasia, and bears a fruit shaped like a pear, yellow in color, which yields a fragrant oil valued as a perfume. This oil is obtained by pressure or by distillation. It is used for flavoring, and in the manufacture of cologne, pomades, and essences.


BERGAMOT ORANGE.

BERGEN (bĕr′gen), a seaport city of Norway, on the coast of Vaagen Bay, in the province of Bergen. The chief buildings include the Lutheran cathedral, the museum, and the nautical school. It has a fine library of 80,000 volumes. Bergen is the second city of Norway, carries on extensive manufactures, and is noted for its fisheries. The stock fisheries yield an income of about $2,500,000 annually, while its cod-liver oil industry, distilleries, and shipbuilding are likewise extensive. It has railroad and electric street railway facilities, electric lighting, pavements, and good schools. Population, 1905, 72,251; in 1920, 91,081.

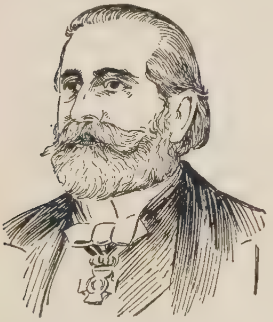
BERGH (bĕrg), **Henry,** philanthropist, born in New York City, May 8, 1820; died there March 12, 1888. His parents were Germans, and his father was a wealthy shipbuilder. He joined his brother in shipbuilding, but soon abandoned that business to enter Columbia College, and after leaving college spent several years in European travels. In 1862 he was made secretary of legation at Saint Petersburg, but resigned after two years and returned to New York, where he organized the Society for the Preven-


HENRY BERGH.

tion of Cruelty to Animals. The society was incorporated on April 10, 1866, and has since grown rapidly in membership. The State of New York passed several laws to protect birds and other animals at his suggestion, and these were since adopted by many states of the Union, Canada, Argentina, Brazil, and other countries. His attention was called to the cruelty practiced upon children in many instances, and in 1874 he organized the Society for the Prevention of Cruelty to Children. These two societies have influenced for good in many communities. Bergh did not only give his time and money to place them on a secure basis, but enlisted the interest and coöperation of many wealthy and talented persons. He wrote a number of poems and sketches.

BERGMAN (bĕrg'män), **Torbern Olaf,** chemist, born at Catherinberg, Sweden, March, 20, 1735; died July 8, 1784. He studied at the University of Upsala, and became distinguished as a chemist and mathematician. In 1758 he was appointed professor of physics at Upsala, where he taught and lectured efficiently a number of years, giving special attention to instruction in chemistry after 1767. He was the first to use the blowpipe successfully, discovered sulphureted hydrogen gas in mineral springs, and laid the foundation of the science of crystallography. He published a number of important works, including "Elective Attractions" and "On the Aërial Acid."

BERGMANN, Ernst von, German surgeon, born in Riga, Russia, Dec. 16, 1836; died March 25, 1907. He studied in the universities of Dorpat, Vienna, and Berlin, and served in the army of Prussia during the wars of 1866 and 1870. In 1871 he was made professor of surgery at the University of Dorpat, where he remained until 1878, when he became professor at Würzburg. He was appointed professor of surgery at Berlin in 1882. In this institution he remained a long term of years, treating in the meantime many celebrated cases in surgery. He was made a life member of the diet of Prussia in 1906. His works include "The Theory of Treating Injuries of the Head," "The Putrid Poison," and "The Chirurgical Treatment of Diseases of the Brain."


ERNST VON BERGMANN.

BERHAMPUR (bĕr'ŭm-pōōr), a town of India, in the lieutenant governorship of Bengal, 115 miles north of Calcutta. It was long a military station of Great Britain. A college, several churches, and the government buildings are among the most important structures. It was the scene of hostilities in the Sepoy mutiny of 1857. Population, 25,380.

BERIBERI (bā-rĭ-bā'rĭ), or **Kakke,** a disease more or less prevalent in Japan and Southern Asia. It is a form of neuritis, but is known as kakke in Japan and beriberi in India. The patient becomes numb or paralyzed and sometimes madness and paroxysms occur. Death frequently results from this disease in from twenty to thirty hours, though many cases are protracted or do not prove fatal.

BERING, or **Behring** (bē'rĭng), **Vitus,** famous navigator, born in Horsens, Denmark, in 1680; died on Bering's Island, Dec. 8, 1741. During the war between Russia and Sweden he displayed great courage and was chosen by Peter the Great to command a voyage of discovery in the vicinity of Kamchatka. In 1828 he explored the coasts of Kamchatka and Okhotsk and the Arctic Ocean north of Siberia. The following year he made surveys of Bering Strait and examined the northwestern coast of North America. He was wrecked on the Island of Awatska, now known as Bering's Island, where he died. Bering Sea and Bering Strait were named in his honor.

BERING SEA (bē'rĭng), the northern extension of the Pacific Ocean, bounded on the north by Asia and Bering Strait, east by Alaska, south by the Aleutian Islands, and west by Kamchatka. It communicates with Bering Strait, which separates Asia from North America, and connects Bering Sea with the Arctic Ocean. Bering's Island is northwest of the Aleutian chain, off the coast of Kamchatka, and is of no value except as a station for seal fishing. It is not inhabited and possesses no timber. The island has an area of thirty square miles, and is noted as the burying place of its discoverer, Vitus Bering.

BERING SEA QUESTION, a controversy between the United States and Great Britain, which originated after the transfer of Alaska from Russia in 1867. In 1870 the Alaska Commercial Company leased of the United States the Pribilof Islands, in Bering Sea, and the Commander Islands of Russia. The company was limited to capture not over 100,000 seals each year, and was required to pay the government $50,000 rental annually. The seals taken from the territory in twenty-three years and sold in the London market were valued at $33,000,000. A dispute arose between Great Britain and the United States as to the control of the seal fisheries, both claiming the territory in dispute. An arbitration commission met at Paris, March 23, 1893, to settle the controversy, after receiving a report from experts. The result of the arbitration was that definite boundaries were fixed for the sealers of Canada and the United States, and proper precaution was taken for the protection of young seals. This adjustment led to a satisfactory conclusion, both on the part of England and the United States, and the maintenance of the law, whereby the seal fisheries are regulated and the seals protected from extermination.

BERING STRAIT, the narrow passage of water which connects the Arctic with the Pacific Ocean, separating Asia from America. The distance at the narrowest point, between East Cape in Asia and Cape Prince of Wales in America, is about thirty-eight miles. Three small islands lie about midway between these points. The depth ranges from 150 to 200 feet. It is frozen in winter, when the ice is formed in great ridges due to the action of the waves, and fog prevails most of the time in the warmer season. It was discovered by the Russians in 1648, and subsequently explored by Vitus Bering and Captain Cook.

BERKELEY (bĕrk′lĭ), a city in Alameda County, California, nine miles northeast of San Francisco, on the Santa Fé, the Southern Pacific, and other railroads. It is the seat of the California State College of Agriculture, the University of California, and the California Institution for the Deaf, Dumb, and Blind. Other institutions include the Berkeley Bible Seminary, the Bowen Academy, and the Boone University School. The city is noted as one of the leading educational centers of the far west. Its industries include planing mills, canning factories, machine shops, and commerce. It has waterworks and electric street railways. It was settled in 1868 and incorporated in 1878. Population, 1920, 55,886.

BERKELEY, George, Bishop of Cloyne, born in Kilcrin, Ireland, March 12, 1684; died Jan. 14, 1753. He became celebrated for his theory called *Idealism,* which explains the phenomena of the universe by referring them to ideas in some form. In 1707 he became fellow of Trinity College, Dublin, and in 1714 traveled in Europe, and again in 1716-20. The following year he was appointed chaplain to the Duke of Grafton, the lord lieutenant of Ireland, and in 1774 became dean of Derry. In 1728 he set sail for Rhode Island with the avowed intention of converting the American savages to Christianity by the establishment of a college in the Bermuda Islands, for which purpose he expected to receive a grant of $100,000 from the government. His philosophy maintains the belief that the world exists only in our thoughts, and that the external objects around us are merely impressions made upon our minds by the action of God, according to certain rules known as laws of nature, which God, as the highest reason, causes to impress our minds. He enjoyed activity and work, and was one of the most persevering thinkers and writers of his time. Among his works are "Treatise Concerning the Principles of Human Knowledge," "Philosophy of the Human Mind," "A Word to the Wise," and "Prospect of Planting Art and Learning in America." In the last mentioned occurs the well known expression, "Westward the course of empire takes its way."

BERKELEY, Sir William, colonial governor of Virginia, born near London, England, in 1610; died at Twickenham, July 13, 1677. He was of noble birth, a graduate of Oxford, and an extensive traveler. In 1632 he was granted a commission to a part of Canada by the king, and in 1641 became governor of Virginia. At first his administration was popular, but later he became involved in disputes with Cromwell and was obliged to resign. When Charles II. was restored, he reinstated Berkeley as governor. His last administration was very unsuccessful. He became involved in a disagreement with Bacon, which ended in an insurrection known as Bacon's Rebellion. Charles II. said of him that he had "taken more lives in that naked country than I have for the murder of my father."

BERKSHIRE HILLS (bĕrk′shĭr), the name of a hilly region of Massachusetts, situated in Berkshire County. These highlands are an extension of the Green Mountains of Vermont, and trend in chains north and south through the western part of the State. Graylock, the highest peak, has an elevation of 3,500 feet, and Mount Everett is about 2,600 feet high. The scenery is beautiful in the summer season, when many tourists visit the points of interest.

BERLIN (bĕr′lĭn), a city of Coos County, New Hampshire, on the Androscoggin River, about twenty miles east of Lancaster. It has transportation facilities by the Boston and Maine and the Grand Trunk railroads, and about fifteen miles distant is Mount Washington. The public improvements include a public library, electric lights, waterworks, and several fine school and church buildings. The chief manufactures are pulp, flour, machinery, earthenware, vehicles, cigars, and clothing. An abundance of water power is obtained from the river, which has a fall of 400 feet in six miles. Population, 1900, 8,886; in 1919, 21,052.

BERLIN, the county seat of Waterloo County, Ontario, on the Grand River, the Canadian National, and the Canadian Pacific railways, about sixty miles west of Toronto. The manufactures include butter, buttons, rubber goods, leather goods, clothing, and machinery. It has a public library, street railways, waterworks, and electric lighting. The chief buildings include a high school and the city hall. The name was changed to Kitchener in 1916. Pop., 1921, 21,605.

BERLIN, the third city in Europe, and the capital of the German Empire. It is situated in the province of Brandenburg, on the Spree River, and is the capital of the kingdom of Prussia. The city is located in the center of what was originally a sandy plain, but the region has been improved by fertilization and cultivation and produces abundantly. In the 13th

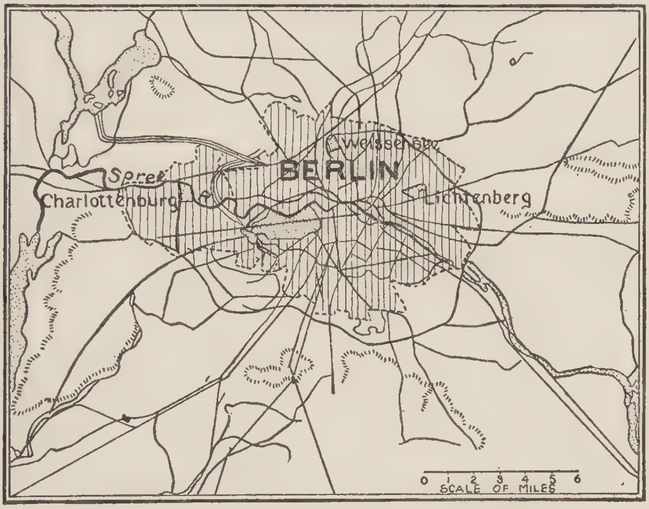
THE REICHSTAG BUILDING, BERLIN

The Reichstag Building, an imposing structure of Silesian sandstone, facing the Königs-Platz (King's Place), a large open square in Berlin, was built in 1884–94. In this building the two Houses of the Reichsrat and Reichstag—the Reichsrat or Imperial Council, and the Reichstag, or Federal Legislature, elected for four years—meet in annual session.

(Opp. 280)

century it was a small fishing village inhabited by Wends. Its growth and prosperity date from the reign of Frederick William, the Great Elector, from 1640 to 1688, who united the separate duchies of which Prussia is now formed and made Berlin the capital, largely because of its central location. In 1861 it covered an area of 14,000 acres; in 1888, over 28,000 acres, and at the present time it is the largest city in Germany.

The original or older part of Berlin has narrow streets and is built irregularly, but the newer part is well platted, has wide streets covered with substantial paving, and its edifices and public buildings are constructed of durable stone in fine architectural forms. Frederick I., successor of Frederick William, devoted much energy to enlarging and beautifying the city, and at the end of his reign it had a population of 50,000. Many substantial improvements made by him are still intact. At the end of the reign of Frederick II. the city had grown to a population of 145,000. After the defeat of Napoleon in 1815, the rise of German power made Berlin a center of art and science, and an important seat of commerce, while, following the successes of Germany in 1870-71, its growth became greater than before. Population, 1920, 2,070,695; Greater Berlin, 3,709,504.



Berlin is one of the great centers of art and intelligence. The royal library contains more than a million volumes, besides 16,000 manuscripts and charts. Its museums are among the most famous, containing magnificent specimens of ancient and modern treasures. Eight public museums, besides the National Gallery and Royal Museum, are maintained and liberally endowed. Each has an old and new part, in which the different exhibits are located. Among them are antiquities of remote ages; casts of ancient, mediaeval, and modern sculptors; pictures representing the six great epochs in human progress; collections of engravings; and galleries of curiosities.

Among the many elegant churches of Berlin are the Dom (Cathedral) Kirche, Emperor Wilhelm Memorial Church, Heiligekranskirche, Zionskirche, and Thomaskirche. The system of education is compulsory. Schools, public and private, are divided into kindergarten, elementary, middle, and higher. There are about thirty high schools, some of which have gymnasiums attached, while others are called *realschulen,* in which Latin, higher mathematics, modern languages, sciences, and commercial pursuits are taught. The universities, normal schools, and academies culminate in the University of Berlin, one of the great seats of modern learning.

Among the noted thoroughfares of Berlin is Unter den Linden, reputed to be the most beautiful street in the world. It is adorned by magnificent structures its entire length of two-thirds of a mile. Many public places are beautified with costly monuments. The most noted is the one dedicated to Frederick the Great, opposite the emperor's palace, which was completed by Rauch in 1703, and is regarded the finest monument in Europe. Other noted monuments are those dedicated to Frederick William III., those commemorating the generals of the Seven Years' War and the generals who fought against Napoleon I., and a beautiful bronze Gothic monument erected by Frederick William III. to commemorate the victories of 1813-15. The monument built by Emperor William I., in the Konigsplatz, to commemorate the triumphs of 1864, 1866, and 1870, rises to a height of 187 feet. These and others represent by statues and busts the celebrated German promoters of literature, science, and political and military life. There are zoölogical and botanical gardens remarkable for extensive and beautiful collections of animal and plant growth. The city has 750 public buildings, including the Royal Palace, the Reichstags Building, and the Brandenburg Gate.

The interior of the city is devoted almost exclusively to commerce, while the residence portion is distributed around the outside. Railroads, electric street railways, extensive canals, and tramways are accessible in all parts of the city, and make it at once a notable center of modern convenience and business activity. The electric lights, gas system, telephones, and tramways are owned, controlled, and operated under the government of the city. The sewer system of Berlin is not only complete and serviceable, but is counted one of the most practical in the world. All the refuse matter is carried to a central point, from which it is pumped by means of great tunnels to outlying districts and used for fertilizing the soil. This condition makes it possible to utilize the refuse animal and vegetable matter of the city for the purpose of increasing the production of vast areas of tillable land, a result that should be obtained in all cities. Manufactures and trades are conducted on a large scale. The production of ladies' mantles alone is over twenty-five million dollars annually, while sewing machines, clothing, machinery, hardware, jewelry, musical instruments, and other productions are of equal proportions.

The government of the city is under the direction of a mayor and thirty-four magistrates, who are elected without regard to politics. The council consists of 108 members, elected for six years, the term of one-third expiring every two years. Both sexes have equal rights of suffrage. Many municipal offices according to custom are filled by women, including both legislative and executive branches, and the merit system of service is enforced throughout the city. Under this system the problem of city government has been successfully solved, and Berlin is not plagued with the usual corruption in government common to most large cities.

BERLIN, Treaty of, a treaty concluded at Berlin, Germany, July 13, 1878, by the Berlin Congress, made up of representatives from Turkey and the six great powers, at the conclusion of the war between Russia and Turkey. The six great powers are Russia, Germany, England, France, Italy, and Austria. It was called at the suggestion of Prince Bismarck. By its terms Greece was enlarged, Britain got Cyprus, Russia took Bessarabia, Austria received Bosnia and Herzegovina, Bulgaria was divided into Rumelia and Bulgaria proper, Persia and Russia got part of Armenia, and the independence of Servia, Rumania, and Montenegro was recognized.

BERLIN, University of, the great national university of Germany, and one of the largest and best equipped institutions of higher education in the world. It may be said to date from 1807, when Frederick William III. called a convention of the most noted German scholars to consider the establishment of an academy or university. The plan was supported by Wilhelm von Humboldt, a brother of Alexander von Humboldt, and he was made first minister of education in 1808 to coöperate with the ministry of the interior in securing support. The palace of Prince Henry and a stipulated annual income were assigned to the foundation in 1809, from which year the present organization may be said to date. It has departments of medicine, theology, philosophy, including the arts and sciences, and jurisprudence, and with it are affiliated several institutions, such as museums, seminaries, and observatories. The minister of education has general control, and support is given by the state through endowments and appropriations. The library has 175,000 volumes, and students have access to the royal library, which has more than a million volumes and many ancient and modern manuscripts. Admission is granted to men of all nationalities and to women under certain restriction. About 400 professors and instructors have charge of the work, and the attendance approximates 14000 students.

BERLIOZ (bêr-lê-ôz′), **Hector,** famous composer, born at Cote-Saint-Andre, France, Dec. 11, 1803; died in Paris, March 8, 1869. He was the son of a successful physician, who desired him to study for the medical profession. However, he preferred music, and studied at the Conservatoire of Paris and in Italy. In the latter country he met Mendelssohn and Liszt. On his return to Paris he published many cantatas and symphonies, and in 1884 played extensively in Germany, England, and Russia. In 1856 he was elected a member of the Institute of Paris, and for some time served as librarian of the Conservatoire. Among his most popular productions are his symphony "Romeo and Juliet," the composition "Faust," the overture "Carnival of Rome," and the sacred selection "Childhood of Christ." He gained much inspiration from the German masters, including Gluck, Weber, and Beethoven, and the Irish actress, Miss Smithson, who afterward became his wife.

BERMUDA (bĕr-mū′dȧ), or **Somers Islands,** a group of 360 islands in the Atlantic Ocean, about 675 miles southeast of New York. Only twenty islands of the group are inhabited and the total area is only twenty square miles. Their formation is largely of coral remains, and they are surrounded by living coral growths. The productions consist of vegetables, including onions, potatoes, and lily-bulbs, and some cereals. A public school system of fifty-five schools, with 1,790 students, is supported by government grants. The islands are a favorite summer resort for people from the United States and Canada, and furnish the New York markets a considerable supply of vegetable products. The value of exports aggregates $600,000, while the imports are somewhat larger. They have a favorable, healthful, and pleasant climate, but the soil is sandy and not productive without fertilizing. These islands are divided into nine parishes that are represented in an assembly and council, and are under the direction of a governor appointed by Great Britain, to which country they belong. They were first discovered by Juan Bermudez, a Spaniard, in 1522, and rediscovered by Sir George Somers in 1609. A cable line connects the group with Halifax, Nova Scotia. Hamilton, the chief town, has a population of 2,246. The total population, in 1922, was 17,860.

BERMUDA GRASS, a kind of grass thought to be native to India, but now cultivated extensively for fodder. It grows in height from one to two feet, depending upon the quality of the soil, and roots at the joints. In many regions it is esteemed as a lawn grass, since it is hardy and remains green until late in autumn. It does not endure in shade, but thrives in either dry or wet places, though it is killed by standing water.

BERNADOTTE (bĕr-nȧ-dŏt′), **Jean Baptiste Jules,** later Charles XIV., of Sweden and Norway, born at Pau, France, Jan. 26, 1764; died in Stockholm, March 8, 1844. His father was a lawyer and chose him for the law, but he preferred the profession of arms and enlisted in the Royal Marines in 1780. He rose rapidly in rank and was a colonel under Napoleon in 1792, and a general in 1797. When Napoleon was in Egypt he served as minister of war, in which capacity he reorganized the army and prepared the way for the conquest of Holland. When the empire was established, he became marshal, and in 1805 commanded an army of 20,000 men. He distinguished himself at Austerlitz, which led to his creation as Prince of Ponte-Corvo, a place near Naples. The diet of Sweden elected him crown prince in 1810, as Charles XIII. had no heir. He adopted him as his son, under the name of Charles John. This scheme was at first opposed by Napoleon, but he finally gave his consent notwithstanding the refusal of Bernadotte to pledge himself not to engage in hostilities against France. His interest for the welfare of Sweden was manifest from the first, and he employed every means to further the prosperity of his adopted country. When the army of France invaded Sweden, he resisted, and in the Battle of Leipsic rendered effectual aid to the allied forces of Europe. In 1814 he required Denmark to cede Norway to Sweden, and the two countries remained united under one crown until 1905. On the death of Charles XIII., in 1818, he became King of Sweden with the title of Charles XIV., although the Emperor of Russia attempted to restore the family of Gustavus IV. His reign of 26 years was marked with great strides of advancement in commerce, manufacture, and agriculture. He succeeded in effecting internal improvements, laying a foundation for public instruction, and enhancing a spirit of national interest. At his death his only son, Oscar I., became King of Sweden. His great-grandson, Gustaf V., is now on the Swedish throne.

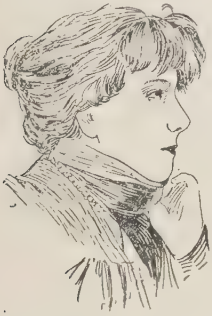
BERNARD (bĕr′nȧrd), **Saint,** theologian, born near Dijon, France, in 1091; died Aug. 20, 1153. He became a monk at Citeaux in 1113, and two years later founded the Cistercian order at Clairvaux, over which he presided as the first abbot. He studied in solitude and his stirring eloquence and thoughtful writing made him an influential factor in the church of his time. Potentates consulted him upon public policies. He was an opponent of Abélard, whose condemnation by the Synod of Paris he approved. He established many monasteries and left numerous sermons and epistles. The English translations of his works include "The Holy War," "Sermons for the Seasons of the Church," "Four Homilies Upon the Incarnation," and "The Jubilee Rhythm on the Name of Jesus."

BERNARD DOG, Great Saint, a variety of dog that derived its name from the hospice of Saint Bernard, where a number are kept for the purpose of assisting in the rescue of perishing travelers. The monks of the hospice are accompanied by these dogs when in search of travelers. They have long been trained to search for persons who might be lost in the mountain passes of the Alps, and are still used for that purpose. When sent in search of persons they carry a flask of wine or brandy about the neck for the relief of the travelers. These dogs have saved many lives in the regions of perpetual snow, not only in the Alps, but elsewhere.

BERNARD, Great Saint, a celebrated pass in the canton Valais, Switzerland, leading over the Alps between Switzerland and Italy. At the crest of the pass is the famous monastery of Saint Bernard, a mile and a half above the sea, the highest dwelling in Europe, first established in the year 962. The snow covers the pass nearly the entire year, and terrible storms often overtake the travelers. This pass has been a famous outlet across the Alps. The armies of Charlemagne, of Frederick Barbarossa, and of Napoleon crossed at this pass. The last mentioned took his army in 1800, including infantry, cavalry, and artillery, numbering about 30,000 men, safely into Italy. It is thought that Hannibal also crossed by the Great Saint Bernard.

BERNE (bĕrn), or **Bern,** the seat of government of a canton by the same name and the capital of the republic of Switzerland. It is located on the Aar River, on a beautiful promontory, and is the center of numerous railroads and extensive commercial enterprises. It is one of the pleasantest cities of Europe, built largely of freestone, and walks and trees extend along both sides of the streets. The public buildings include the Gothic Cathedral, built in the latter part of the 15th century, the Federal Building, the Church of the Holy Spirit, the university, the townhouse, the public mint, and the theater. It has a city library of 100,000 volumes and the finely constructed Swiss National Library. Other institutions include the public museum, the armory, and many academies and hospitals. All modern municipal conveniences have been provided. Canals wind through the streets from the Aar River, and numerous fountains and monuments adorn its public places. The manufactures include gunpowder, leather goods, dress fabrics, firearms, paper, musical instruments, and other products, although it is not a great manufacturing center. The city was founded by Berthold V. in 1191. It became a free city in 1218, and in 1353 united with the Swiss Confederacy. The spoken language is German and the people are mostly Protestants, only a small per cent. being Catholics and Jews. Population, 1920, 105,096.

BERNHARDT (bĕrn'härt), **Rosine,** commonly called Sarah, famous actress, born in Paris, France, Oct. 22, 1844. She descended from Jewish parents, but was baptized in the Christian faith, and was instructed in the convent at Versailles. In 1858 she entered the Paris Conservatoire, where she gained credit as a student and made her début in 1862 at the Theatre Francais, but did not attain success and temporarily left the stage. In 1867 she was successful in playing the part of the *Queen of Spain* in "Ruy Blas," and of *Zanneto* in "Passant." In 1872 she reappeared in the Theatre Francais and in 1879 played in London, and attained excellent success in both cities. Subsequently she visited North and South America and many of the large cities of Europe, meeting everywhere with good success. She made visits to the United States and Canada in 1887, 1891, 1896, and 1900, and greatly increased her popularity with each visit. In 1913 she made her farewell tour of American cities, and played in the leading theaters of the United States and Canada to large audiences with the result that her popularity was maintained. While on this tour she appeared in "Sapho," "Fédora," "La Dame aux Camelias," "Magda," "La Tosca," and "Le Femme de Claude." Critics consider her one of the greatest recent actresses. She attained success in painting and sculpture. She died Mar. 26, 1923.


SARAH BERNHARDT.

BERNINI (bĕr-nē'nê), **Giovanni Lorenzo,** sculptor and architect, born in Naples, Italy, Dec. 7, 1598; died Nov. 28, 1680. He studied at Rome, where he was patronized by Urban VIII. and a number of succeeding popes. He went to France in 1664 and made an equestrian statue of Louis XIV. Subsequently he made monuments of Urban VIII. and a number of other popes, and constructed the altar of Saint Peter's in Rome. "Apollo and Daphne" is one of his fine sculptures.

BERRY (bĕr'rȳ), a small, fleshy and juicy fruit which does not open when ripe. It contains a pulpy mass in which the seeds are immersed. Some varieties are one-celled, but others contain compartments united at the axis, and from the axis to the rind. Good examples are gooseberries, currants, grapes, and belladonna. The term is applied to strawberries, which bear seeds on a pulpy receptacle.

BERNSTORFF, Count Johann Heinrich, diplomatist, born in Germany in 1862. His father, Count Albrecht Bernstorff (1819-1873), was prominent in diplomacy, serving many years as ambassador at London. The son served in the army and in 1889 entered the diplomatic service of Germany. In this capacity he served in Turkey, Servia, Russia, England and Egypt, and in 1908 was made ambassador to the United States. The Great European War caused his position to be a very delicate one and his efforts were untiring for a peaceful solution of the questions involved. He remained at his task until 1917, when diplomatic relations were broken off and he received his passports.

BERWYN, a city of Illinois, in Cook County, on the Illinois Central, and the Chicago, Burlington and Quincy railways. It is noted as a residential center of Chicago business men. The features include the high school and the Berwyn Club building. It was incorporated as a city in 1908. Population, 1920, 14,150.

BERYL (bĕr'ĭl), a mineral found in many parts of Canada, the United States, and other countries. It crystallizes in six-sided prisms, and ranges as colorless, blue, green, or yellow, though always quite pale. Those of a sea-green or clear yellow color are preferred as gems, and the rich green kinds are emeralds. Jewelers call the finer grades *acqua marine.*

BERZELIUS (bĕr-zē'lĭ-ŭs), **John Jacob, Baron,** chemist, born in East Gothland, Sweden, Aug. 20, 1779; died Aug. 7, 1848. He studied medicine and chemistry at Upsala, and in 1806 was made lecturer on chemistry in the military academy at Stockholm, where he was chosen a member of the Academy of Sciences, of which he was secretary until his death. His work entitled "Treatise on Animal Chemistry" has been translated into several languages. The system of chemical symbols now in general use was originated by him, and he is the discoverer of the elements *selenium* and *thorium.* He investigated and treated in writings platinum, vanadium, fluoric acid, and sulphur salts. "System of Chemistry" is his chief work.

BESANÇON (be-zŏn-sôn'), a city of France, located on the Doubs River, and capital of the department of Doubs. It is considered one of the strongest cities of France, owing to its citadel, which is located on an elevated rock 410 feet high. The chief buildings include the cathedral, the museum, the public library, a college, and the prefecture. In the time of the Caesars it was known as Vesontio and was occupied by the Romans a long term of years. It has many structures dating from the Romans, including a triumphal arch built by Marcus Aurelius. The Burgundians held it in the 5th century, and the Germans in the 12th. In 1679 it was ceded to France. The city now is a railroad and manufacturing center. Its products include cotton, woolen, and silk goods, machinery, ironware, and watches.

The latter industry employs over 3,400 hands. It is the birthplace of Abel Rémusat and Victor Hugo. Population, 1921, 56,168.

BESANT (bê-sănt′), **Sir Walter,** novelist, born in Portsmouth, England, Aug. 14, 1838; died June 9, 1901. He was the son of a merchant, attended King's College, and subsequently graduated from Cambridge University. In 1861-67 he was professor of mathematics in the Royal College of Mauritius, and while occupying that position wrote his first novel, but it was not published until he subsequently revised it. His first work, "Studies in Early French Poetry," is a production which gives evidence of profound study and scholarship. Much of his writing was done in connection with James Rice, and he contributed independently to numerous magazines and cyclopaedias. In 1895 he was knighted, a distinction bestowed on him because of his success in letters and for the reason that he established the People's Palace, an institution founded in the interest of social reform in London. Among his best known works are "Bell of Saint Paul's," "In Faith and Freedom," "All Sorts and Conditions of Men," "Children of Gibeon," and "History of London."

BESSARABIA (bĕs-sȧ-rā′bĭ-ȧ), a province of Russia, bordering on Rumania and the Black Sea. The surface is level except in the northwest, where timbered ranges of the Carpathian Mountains attain to considerable elevations. Much of the soil is fertile and in a state of good cultivation, and all classes of live stock and cereals common to Europe are grown profitably. The inhabitants are made up of different races and include Bulgarians, Russians, Poles, Jews, and Tartars. Turkey governed the region from 1503 until 1812, when it was ceded to Russia by the Peace of Bucharest. The Treaty of Paris gave the southeastern part to Turkey in 1856, but it was restored to Russia in 1878 by the Treaty of Berlin. It was invaded by an Austro-German army in 1915. Kishinev (population, 1911, 129,728) is the capital and largest city. Area, 17,600 square miles; population, 1921, 2,004,545.

BESSEMER (bĕs′ê-mẽr), a city of Jefferson County, Alabama, fifteen miles southwest of Birmingham, on the Southern, the Louisville and Nashville, and other railroads. It is noted as the center of an iron producing region, and is the seat of extensive rolling mills and blast furnaces. The manufactures include chemicals, machinery, clothing, and brick. It has a large trade in cereals and merchandise. The city is improved by waterworks, sewerage, and excellent school and church buildings. Population, 1920, 18,674.

BESSEMER, Sir Henry, engineer and inventor, born in Hertfordshire, England, Jan. 9, 1813; died in London, March 14, 1898. He was largely self-taught, but became a prolific inventor. Among his inventions are the perforated figure stamps used in the British stamp office, the Bessemer process of manufacturing gold and bronze powders, and Bessemer steel. The last mentioned is his greatest invention and has had a wide influence upon the commerce of the world. By the adoption of this process the production of steel has been increased very materially, both in the commercial countries of Europe and in America. This process has not only facilitated the production of steel, but has reduced the cost more than 500 per cent. The inventor became very wealthy from the profits of his inventions. He was knighted in 1879 and granted many gold medals by scientific institutions. He was also made a fellow of the Royal Society and a member of the Institution of Civil Engineers.

BESSEY (bĕs′sĭ), **Charles Edwin,** educator and botanist, born at Milton, Ohio, May 21, 1845. He studied with Asa Gray at Harvard and in 1870 became professor of botany in the Iowa Agricultural College at Ames, where he taught and lectured successfully until 1884, when he was elected professor of botany at the University of Nebraska. In 1882 he was acting president of the Iowa Agricultural College and for a number of years was acting chancellor of the University of Nebraska. Several important educational and scientific societies recognized his ability by placing him on important committees and in official positions. He contributed to "Johnson's Universal Cyclopedia" and to numerous journals. Among his publications are "Elementary Botanical Exercises," "Botany for High Schools and Colleges," "The Essentials of Botany," and "Plant Migration." He died Feb. 25, 1915.

BETEL (bē′t'l), or **Betle,** the name of a narcotic stimulant derived from a certain species of pepper. In the market it is known as betel pepper or as betel nut, depending upon the form in which it is sold. The betel nut used as a stimulant in Asia is made by slicing the nut of *areca palm,* flavoring with a little quicklime, and wrapping it with the leaf of the betel pepper. It has aromatic and astringent properties, colors the teeth black and the tongue and lips scarlet, and is bitter and unpleasant to a person not in the habit of using it. Both male and female, young and old, chew it habitually. A supply is carried in small cases, and people offer it to each other as snuff or cigars are offered by Europeans. The plant, of which there are several species, is cultivated extensively. The fruit of the areca palm is about the size of a cherry and is grown for the market in Ceylon and Southern Asia.

BETHANY (bĕth′ȧ-nĭ), a village about two miles east of Jerusalem, Palestine, containing at present about 200 inhabitants. It was the home of Mary, Martha, and Lazarus, where Christ often visited and worked numerous of his greatest miracles. Near this place Christ's ascension took place. Travelers are shown a cave near Bethany in which Lazarus was buried and the site of his home.

BETHESDA (bê-thĕz'dȧ), which implies "home of the stream," a pool near Saint Stephen's Gate and the Temple of Omar in Jerusalem. It is associated with the healing of the impotent man. The length of the pool is 460 feet; width, 130; depth, seventy-five feet. It is now called Briket Israel. See John v, 2-9.

BETHLEHEM (bĕth'lê-hĕm), a city of Northampton County, Pa., 50 miles north of Philadelphia, on both sides of the Lehigh River. It is on the Lehigh Valley, the Central of New Jersey, and other railroads. Two bridges across the Lehigh River connect it with South Bethlehem, the seat of Lehigh University and the Bethlehem Ironworks. The chief buildings include the public library, the Church of the Nativity, and Saint Luke's Hospital. It has manufactures of silk textiles, graphite products, brass and iron implements, machinery, flour, and cigars. A system of theological institutions is supported by the Moravians, in one of which General Lafayette was nursed after being wounded at the Battle of Brandywine. Bethlehem was founded by the Moravians in 1742 and was chartered in 1851. Population, 1900, 7,293; in 1920, 50,358.

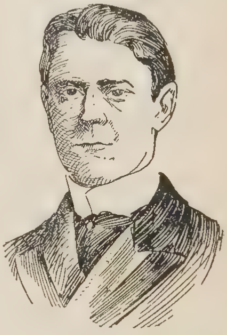
BETHLEHEM, "the house of bread," a small town six miles south of Jerusalem, in Palestine, the birthplace of Christ. It contains the Convent of the Nativity, built by Empress Helena in 327 A. D., destroyed in 1236 by Moslems, and restored by the Crusaders. It is in charge of Armenian, Greek, and Latin Christians. Under a richly adorned grotto are crystal and silver lamps that mark the exact spot where Christ was born. The manger in which he was laid is one of the central attractions. An elaborate inscription in Latin contains the information, "Here Jesus Christ was born of the Virgin Mary." The town has three convents for Greeks, Armenians, and Roman Catholics. The inhabitants engage largely in trades and the manufacture of crucifixes and rosaries to sell to pilgrims. Population, 7,885.

BETHSAIDA (bĕth-sā'ĭ-dȧ), the "house of the fish," the name of two villages on the Sea of Galilee, one of which still remains. These villages were on the western and northern shores of the lake. The former was the birthplace of three of Christ's disciples, Peter, Philip, and Andrew; the latter was the scene of the feeding of five thousand by Christ.

BEUST (boist), **Friedrich Ferdinand, Count von,** eminent statesman, born in Dresden, Germany, Jan. 13, 1809; died in Vienna, Austria, Oct. 24, 1886. He attended the Universities of Göttingen and Leipsic, became devoted to politics at an early age, and distinguished himself both in the field and as a legislator. In 1849 he was made minister of foreign affairs, but opposed Prussia after the Battle of Sadowa, and entered the services of Austria as chancellor in 1867. Under his administration the Austrian Empire was reorganized by the powers and the present constitution was adopted. In 1871-78 he served as Austrian ambassador at London and in 1878-82 at Paris.

BETHMANN-HOLLWEG, Theobald Theodor von, jurist and statesman, born in Hohensinow, Germany, Nov. 29, 1856. He studied law and held official positions in Potsdam, Bromberg and the province of Brandenburg, serving as governor in the latter. In 1905 he was made Prussian minister of the interior and in 1909 succeeded Prince von Bulow as chancellor of the empire. Count von Hertling succeeded him as chancellor in 1917. In his high position he advocated pan-Germanism, advised a conciliatory policy toward the United States, and favored concluding a treaty of peace with Russia at Brest-Litovsk. He died Jan. 1, 1921.

BEVERIDGE (bĕv'ĕr-ĭj), **Albert Jeremiah,** public man, born on a farm in Adams County, Ohio, Oct. 6, 1862; died Apr. 27, 1927. His family removed to Illinois, where he attended the common and high schools, and in 1885 graduated at De Pauw University, Indiana. Subsequently he read law in the office of Senator McDonald and was admitted to the bar. For some time he was associated with the firm of McDonald & Butler, after which he practiced for himself in Indianapolis and was identified with many important cases. He became United States Senator in 1899 and was reëlected in 1905. In 1915 he visited Europe and wrote several books relating to the war. In 1922 he was defeated by Harry S. New for U. S. Senator.



ALBERT J. BEVERIDGE.

BEVERLY (bĕv'ẹr-ly), a city of Essex County, Massachusetts, on a bay of the Atlantic, eighteen miles northeast of Boston. It is on the Boston and Maine Railroad and is connected with Salem by a bridge which spans the bay. It has a good harbor, extensive leather and shoe factories, and grain elevators, and has modern municipal facilities, including gas and electric lights, pavements, and street railways. The public library contains 50,000 volumes. It is the seat of the New England Institute for the Deaf and Dumb. The region was settled in 1630 and the city was chartered in 1894. Population, 1905, 15,222; in 1925, 22,685.

BEWICK (bū'ĭk), **Thomas,** engraver, born near Newcastle-on-Tyne, England, Aug. 12, 1753; died Nov. 8, 1828. He is considered the founder of the modern English school of wood engraving. A collection of about 2,000 prints engraved by himself and his brother, John Bewick, was published under the title, "Bewick Collection of Bewick's Wood Cuts." He illustrated Goldsmith's "Deserted Village," joined Beilby in publishing "History of British Quadrupeds," and prepared the illustrations for "History of British Birds."

BEYROUT (bā'rōōt), or **Beirut,** formerly called Berytus, the chief seaport of Syria, sixty miles northwest of Damascus. It is of commercial importance, being visited by steamers of the regular service from French, German, British, and Egyptian ports. Its exports consist largely of tobacco, wool, olive oil, cereals, and gums. The chief manufactures include cotton and silk goods, jewelry, and clothing. Its commerce with foreign powers is tending to give it a modern appearance and many European facilities. It has a number of fine schools, churches, synagogues, and government buildings. It was an important city in the time of the Phoenicians. The Byzantine emperor, Theodosius II., greatly enlarged it, and its greatest importance was reached in the time of the Crusades. Subsequently it fell into the hands of the Druses, was bombarded by the British in 1840, and is now under Turkish dominion. Population, 1921, 148,890.

BEZA (bē'zȧ), **Theodore,** early religious reformer, born in Burgundy, July 24, 1519; died Oct. 13, 1605. He was educated in Orleans under the German scholar Melchior Volmer, a strong advocate of the Reformation, whose principles he communicated to his pupil. In 1539 he went to Paris and ten years later became professor of Greek at Lausanne. He supported the reforms of the King of Navarre and attended upon Condé and Coligny. Beza became distinguished as a reformer of the church at Geneva, which fell entirely to his care in 1564. Besides translating the New Testament into the French, he published a number of standard works, among them "History of Calvinism of France from 1521 to 1563," "The Sacrifice of Abraham," and "Theological Treatises."

BÉZIERS (bȧ-zyȧ'), a city of France, in the department of Hérault, thirty-eight miles southwest of Montpelier. It is on the Orb River and the Canal du Midi, and has steam railroad and electric railway facilities. It is the seat of a fine Gothic cathedral, a college, and a public theater. Glass, silk textiles, leather goods, and machinery are among the manufactures. It was a fortified town in the time of the Romans, and the scene of a massacre of the Albigenses by Simon de Monfort, who killed about 20,000 of its citizens. Population, 1921, 52,268.

BHUTAN (bōō-tän'), or **Bhotan,** an independent state of India, located south of the Himalaya Mountains and west of Tibet. The surface is greatly diversified by mountain ranges, some of whose peaks have an altitude of 16,500 feet above the sea. Stock raising and agriculture are the chief industries, and the manufactures are confined largely to textiles, musk, and utensils. The people are a mixture of Aryan and Tibetan stock, and practice both polygamy and polyandry. Buddhism is the chief religion. The government is administered by two rulers, one a secular and the other a spiritual official. Dosen, or Punakha, is the capital. Great Britain annexed a part of the territory of Bhutan in 1865. Population, about 200,000.

BIAFRA (bē-ä'frȧ), **Bight of,** an inlet on the Atlantic coast of Africa, the eastern part of the Gulf of Guinea. It lies between Cape Lopez and Cape Formosa, and borders French Congo and the German possession of Kamerun. Prince's Island and the islands of Saint Thomas and Fernando Po are near or in the bight.

BIAS, a scholar of ancient times, one of the seven wise men of Greece, flourished in the 6th century B. C. He was a native of Priene, a son of Teutames, and a contemporary of Croesus, King of Lydia. He was distinguished for wisdom and eloquence. Many of his short sayings have been preserved, such as "I carry all my goods (riches) with me."

BIBLE (bī-b'l), the book held by Christians to contain the word of God and regarded as infallibly true. The word *Bible* is derived from mediaeval Latin, in the singular number, and means a book. The Greek form of the word is plural and means books. As commonly used it signifies *the book,* in comparison with which other books or writings are unworthy; or, if they be called books, then the Bible becomes *the book of books.* The Latin words *scriptura*=writing, *scripturae*=writings, convey the idea that the Scriptures are the only writings worthy of being called writings; therefore, they stand higher than all other books. This use came from the Latin fathers and has met general acceptance by all Christian nations.

The Bible consists of two parts, the Old and the New Testament, meaning covenants between God and his people. It includes also the *Apocrypha,* which is held to be canonical by some, and as good and useful for family reading by others. The Roman Catholics and several other Christian churches hold the Apocrypha canonical, but combine with it church traditions regarding faith and morals. Protestant churches do not accept more than the Old and New Testament as the canonical word of God. Jews accept only the Old Testament. The Jewish religion holds that a compact exists between God and the Jews, while the Christian religion holds that God has given the Bible as a compact between Himself and the human race.

The Greeks of Alexandria completed a translation of the Old Testament about 230 B. C., known as the *Septuagint.* This is the earliest and most famous version, and was adopted by the early Christian Church as well as by the Jews, and has always held an eminent place in Bible history and interpretation. There are other celebrated versions, known as the *Syriac version,* made in the 2d century B. C.; the *Coptic version,* in the 3d or 4th century A. D., and the *Gothic version,* in the 4th century. Both the Coptic and Gothic were made from the Septuagint. Jerome in the year 405 A. D. completed the most important Latin version, largely on the basis of the original Hebrew, which is known as the *Vulgate.* The first edition of the entire Hebrew Bible was published in 488 in Soncino. It was written on linen cloth, skins, or papyrus kept in rolls. The books of the New Testament were written in Greek, with the possible exception of Saint Matthew, which was, perhaps, originally written in Hebrew, but was early translated into the Greek. No other book has been so largely translated and generally read as the Bible. In modern times it has been extensively circulated in all languages.

In 1382 the first English translation was made, known as the *Wyclif's Bible,* but the first printed version of the New Testament was Tyndale's, and in 1535 Miles Coverdale published the first complete English Bible. In the reign of Mary the English refugees at Geneva published the *Great Bible* through the efforts of Lord Cromwell, and later several other editions were issued. In 1611 the authorized version of King James appeared, which is known as the *King James Bible.* It was instigated by Hugh Broughton, and undertaken after the Hampton Court Conference was suggested by King James I. Six companies, two at Cambridge, two at Oxford, and two at Westminster, consisting of forty-seven scholars, undertook the work, while at London a general committee revised the portion translated by each committee. The entire work was done in three years. Owing to the purity of style and the general accuracy with which the translation was made, it has superseded all other versions in the English. The version recognized by the Roman Catholic Church is a translation made from the Latin Vulgate; the New Testament translation was completed at Rheims in 1582, and the Old Testament at Douay in 1609-10.

In 1870 the convocation of Canterbury appointed a committee to investigate the necessity of making a new version in English. They reported favorably, and accordingly two companies were organized, one each for translating the Old and the New Testament. The company consisted of members of the convocation and other eminent scholars, and was aided by two similar companies organized in America to aid the British scholars. They published what is known as the Revised Version of the New Testament in 1881 and that of the Old Testament in 1884. Although some alterations were made and a number of points in accuracy, clearness, uniformity, and grammatical constructions were effected, the King James edition still occupies a larger field. The German translation holds equal rank with the English, and is the most famous for clearness and accuracy of the early translations into the modern languages. It was made by Martin Luther in 1534, and is generally accepted by German speaking people as the most accurate in that language.

The Jews divide the Old Testament into three divisions: the law, the prophets, and the sacred writings. *The Pentateuch,* as the five Books of Moses are usually called, contains the Jewish law, but of course includes also prophecy, history, and biography. The law is included in three parts: the *Book of the Covenant,* followed by the Israelites till the reign of Joshua; *Deuteronomy,* from Joshua to the exile; and the *Priestly Code,* which became authoritative after the Restoration. The prophets were divided by their scholars into the Former and the Latter. The Former Prophets embrace the historical books containing much of interest regarding the Jewish nation and their statesmen. They begin with Joshua and include all of the Old Testament books up to the prophet Isaiah. The Latter Prophets include the portion from Isaiah to Malachi, with the first and last included. The sacred writings of the Old Testament embrace the history of the Jewish people, their praise of God in psalms, their lamentations, proverbs, and prophecies. The whole contains many promises that the people are to be delivered out of all earthly troubles, and attain perfect bliss by the advent of a Messiah. These prophecies are still held by the Jews to indicate the coming of a deliverer, to whose advent they still look with hopeful confidence, while to Christians the prophecies mean a promised delivery which has been effected by the birth of Christ.

The New Testament commences with the *Gospels,* four accounts of the life of Christ by his followers; the first by Matthew, the second by Mark, the third by Luke, and the fourth by John. Matthew and John were disciples of Christ, while Mark was a companion of Peter, and Luke a companion of Paul. The Gospels are followed by the *Acts of the Apostles,* which gives an account of the early church and its foundation. Later come the twenty-one letters of the apostles to the churches, and some to the apostles as they were engaged in the active work of organizing and spreading the gospel. The last Book of the New Testament is the *Revelation of Saint John,* commonly called the *Apocalypse.* The books of the New Testament usually appear in uniform order, while the order of the Old Testament depends largely upon its translation. In the Hebrew Bible the divisions are different from those of the English, which in this respect follows the Greek Septuagint and the Latin Vulgate. The Jewish division into the law, the prophets, and the psalms is quoted in Luke xxiv, 44, in these words, "that all things might be fulfilled that are written in the law, and in the prophets, and in the psalms." While the books are arranged differently, we give below the order in which they usually appear. The sixteen prophets, which belong to the Old Testament, are separated for convenience in reference:

BOOKS OF THE OLD TESTAMENT.

Genesis,
Exodus,
Leviticus,
Numbers,
Deuteronomy,
Joshua,
Judges,
Ruth,
I Samuel,
II Samuel,
I Kings,
II Kings,
I Chronicles,
II Chronicles,
Ezra,
Nehemiah.
Esther,
Job,
Psalms,
Proverbs,
Ecclesiastes,
Song of Solomon.

THE SIXTEEN PROPHETS.

Isaiah,
Jeremiah,
Lamentations,
Ezekiel,
Daniel,
Hosea,
Joel,
Amos,
Obadiah,
Jonah.
Micah,
Nahum,
Habakkuk,
Zephaniah,
Haggai,
Zachariah,
Malachi.

THE APOCRYPHA.

I Esdras,
II Esdras,
Tobit,
Judith,
The Rest of Esther,
Wisdom of Solomon,
Ecclesiasticus,
Baruch,
Song of the Three Holy Children,
Susanna,
Bel and the Dragon,
Manasses,
I Maccabees,
II Maccabees.

BOOKS OF THE NEW TESTAMENT.

Matthew,
Mark,
Luke,
John,
The Acts,
Epistle to the Romans,
I Corinthians,
II Corinthians,
Galatians,
Ephesians,
Philippians,
Colossians,
I Thessalonians,
II Thessalonians,
I Timothy,
II Timothy,
Titus,
Philemon,
Hebrews,
Epistle of James,
I Peter,
II Peter,
I John,
II John,
III John,
Jude,
Revelation.

No matter under what form of translation the various books appear, the contents of the Bible has for its object to give an account of the world as the creation of an Almighty Creator, always and everywhere present. It accounts both for the origin and government of mankind, and exhibits the relation of man to his Creator. While it teaches him how to live and die, it inspires him with thoughts of the most momentous proportions that can occupy the human mind. It is the aim of all sacred books, no matter of what religion, to explain the origin of all things and account for the relations of nature and humanity to something divine. The Bible is immeasurably superior to all other sacred books in that it leads to a conception, and unfolds to the soul the divine nature, of one personal God, who exercises a divine love and care for his creatures. On this quality ascribed to God by the Bible many rest their claim that it is divinely inspired by direct revelation from heaven.

The *Mazarin Bible* was the first book to be printed from movable type. It was issued by Gutenberg (q. v.) at Mainz, Germany, in 1450 and it is in the Latin. The name is from Cardinal Mazarin (d. 1661), in whose library the first copy to attract attention was found in 1760. A number of Bible curiosities, including some points of general interest, were ascertained by a convict who was sentenced to solitary confinement. Among them the following are the most noteworthy: The Bible contains 3,586,489 letters, 773,692 words, 31,173 verses, 1,189 chapters, and 66 books. The word *and* occurs 46,277 times; *Lord,* 1,855, and *reverend* but once, which is in the 9th verse of the 111th Psalm. The middle verse is the 8th verse of the 118th Psalm. In the 21st verse of the 7th chapter of Ezra are all the letters of the alphabet except *J.* The finest chapter to read is the 26th chapter of the Acts of the Apostles. The 19th chapter of II Kings and the 37th chapter of Isaiah are alike. It was found that the longest verse is the 9th verse of the 8th chapter of Esther, and the shortest is the 35th of the 11th chapter of Saint John. The 8th, 15th, 21st, and 31st verses of the 107th Psalm are alike. Each verse of the 136th Psalm ends alike. There are no words or names of more than six syllables.

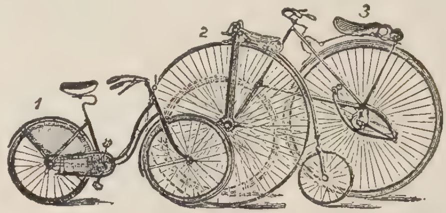
BIBLE DISTRIBUTION, an enterprise having for its object the translation of the Bible into all spoken languages and its circulation for the dissemination of the Christian cause. The enterprise dates from the early part of the 19th century, but received its greatest impetus in 1820, up to which year 2,843,291 Bibles had been circulated. The circulation in the past four decades has averaged about thirty million copies each ten years. Since this work was begun the total circulation exceeds 185,000,000 copies. The languages into which the Bible has been translated have now reached 750. They are distributed as follows: the British Isles 8, Continental Europe 171, Asia 253, the Oceanic Islands 82, Africa 196, and America 45. There are no less than one hundred societies promulgating the spread of light and knowledge by means of the Bible through the world. No less than $55,500,000 has been spent for this laudable purpose the past seventy-five years. The societies that have been most potent in this enterprise are the American Bible Society, the British and Foreign Bible Society, the Prussian Bible Society, and the Imperial Russian Bible Society. In 1829, 1856, 1866, and 1882 it was the aim of the American Society to place a Bible in every home in America not already supplied.

BIBLIOGRAPHY (bĭb-lĭ-ŏg′rȧ-fȳ), the science or knowledge of books, relating both to the external features and the value of their contents. The subject is sometimes divided into *pure bibliography,* which relates to the external feature of books, and *applied bibliography,* which takes cognizance of their repute and degree of value. A classification of a list of works treating of some particular branch of knowledge is called a *bibliography,* such as a bibliography of electricity or one of political economy. Conrad von Gesner (1516-65), of Switzerland, prepared his "Bibliotheca Universalis," in which he published a very extensive list of books issued in the Hebrew, Greek and Latin languages. The work known as "The American Catalogue," published in New York City, contains a comprehensive list of authors and a title index of books published in the United States, supplemented with an annual issued from time to time. The "English Catalogue" contains a similar list of books or works published in Great Britain. A large number of German works of this kind have been issued, notably among which is Kayser's "Complete Book-Lexicon." Lorenz's "General Catalogue" is a very comprehensive French work. American works that should be mentioned in this connection are Baker's "Guide to the Best Fiction," Scribner's "Bibliographical Guide to American Literature," and Duyckinck's "Cyclopaedia of American Literature." Allibone's "Critical Dictionary of English Literature" contains a comprehensive list of both English and American books.

BIBLIOMANIA (bĭb-lĭ-ō-mā′nĭ-ȧ), the name used to describe the passion for acquiring or possessing books, especially those considered rare and of unusual value. Persons who make such collections regard rarity more important than utility and seek to acquire books issued from a certain press, of early and rare editions, or those in which the author personally signed his autograph. *Editions de luxe* were the first to be gathered, and later books issued by Caxton, Gutenberg, and other early printers came into great demand. The Mazarin Bible, with imprint of 1450, said to have belonged to Cardinal Mazarin, sold in 1804 for £3,950. Books in which certain faults or typographical errors were overlooked by noted authors sometimes bring high prices, and copies of "Decameron" of the first edition are especially valuable. The Grolier Club of New York City is a society of book lovers who reprint rare works for their own use.

BICEPS (bī′-sĕps), the large muscle of the upper arm, which gives a full appearance to the front part of that limb. At the lower end it is attached to the radius by a tendon, and at the upper extremity to the scapula. The action of the biceps is to bend the elbow. At the outer and posterior part of the thigh is another biceps. The muscle back of the arm, which works in unison with the biceps, is called triceps.

BICYCLE (bī′-sĭ-k'l), a two-wheeled machine for riding by pressing the feet on pedals. The modern safety bicycle has been brought to a high state of perfection and has assumed an important place as a means of locomotion. It not only serves for pleasure and for convenience in travel, but is utilized in war by the equipment of soldiery for military service. In many countries large bodies of armed men are drilled and equipped to use the bicycle as a means of transportation and for service in the intelligence department. It is a popular machine for long trips into the interior of continents, or for the purpose of crossing large bodies of land for exploration and newspaper reporting.



1. SAFETY BICYCLE. 2 AND 3. HIGH-WHEELED BICYCLES.

The first bicycle was introduced into England in 1818. It consisted of a two-wheeled contrivance with a seat affixed to a wooden beam, on which the rider sat astraddle, and by kicking the ground facilitated moving forward. This finally led to the conclusion that two-wheeled machines could be made in such a manner that the rider would not need to depend upon his feet for aid in keeping it in an erect position. In 1869 a bicycle was manufactured in Europe known as the *bone-shaker,* which consisted of a wood and iron frame, and later rubber tires and steel frames were added. The bicycles made in 1880 weighed about fifty pounds and were high-wheeled machines with rubber tires.

The manufacture of high-grade bicycles dates from about 1895, when machines having a weight of twenty pounds were introduced. This pattern is now in general use. It is provided with pneumatic tires, tubular steel frames, ball bearings, and endless chains, and some patterns have chainless appliances. The pneumatic tire is made of several thicknesses of canvas enforced by vulcanized rubber, and contains an endless air-tight rubber tube. It is held to a steel or wooden rim. By means of ball bearings friction is greatly reduced, and tubular frames aid in the reduction of weight. The modern *safety bicycle* is a popular invention and serves a variety of useful purposes. The most recent improvement is the addition of an electric storage battery, or a gas engine, by which the rider is aided in the use of the machine. The difficulty of riding against a strong current of wind or up grades is thus overcome, and facilities are provided to enable making greater speed at less exertion of the body. This machine in its various forms is popular and has displaced the use of other vehicles to a certain extent as a business conveyance. It is called a *motor bicycle*

BIDDEFORD (bĭd′dē-fẽrd), a city of York County, Maine, on the Saco River, fifteen miles southwest of Portland. It is on the Boston and Maine Railroad. The city has excellent street railway service, fine schools, gas and electric lighting, and other modern conveniences. Its public high school is one of the finest in the State. The granite in its vicinity is inexhaustible in quantity and superb in quality. The city is surrounded by an agricultural country and has extensive factories and a large commerce. It was settled in 1630, incorporated in 1718, and became a city in 1855. Population, 1900, 16,145; in 1920, 18,008.

BIDDLE (bĭd'd'l), **James,** naval officer, born in Philadelphia, Pa., Feb. 28, 1783; died Oct. 1, 1848. He attended the University of Pennsylvania, and in 1800 entered the navy as a midshipman for service in the War with Tripoli. While on board the frigate *Philadelphia,* he was taken a prisoner and confined several months. In the War of 1812 he was lieutenant on the *Wasp,* which captured the *Frolic,* and later he commanded this vessel. Both the *Wasp* and *Frolic* were captured by the British and taken to Bermuda, but he was exchanged in 1813 and commanded in the operations in the East Indies. He received a gold medal from Congress for gallant services and subsequently was made captain. He served on the Pacific coast during the Mexican War.

BIDDLE, John, founder of modern Unitarianism, born in Gloucestershire, England, in 1615; died Sept. 22, 1662. His education was secured at Oxford, and soon after he became master of a school at Gloucester. The fearless manner in which he announced and advocated his views caused his imprisonment. A tract circulated by him, entitled "Twelve Arguments Drawn Out of Scripture, Wherein the Commonly Received Opinion Touching the Deity of the Holy Spirit Is Clearly and Fully Refuted," caused him to be summoned before a committee of Parliament, and he was sentenced to imprisonment by that body. In 1652 an act was passed by which he was granted complete freedom. After holding numerous meetings and publishing his opinion in "Twofold Scripture Catechisms," he was again imprisoned. Cromwell banished him to Saint Mary's Castle, Scilly Islands. After three years he returned to England and was again committed to jail for advocating his views.

BIDWELL (bĭd'wĕll), **John,** statesman, born in Chautauqua County, New York, in 1819; died in Chico, Cal., April 4, 1900. He was educated at Kingsville Academy, Ohio, and engaged in school teaching. In 1841 he emigrated to California and volunteered in the Mexican War, in which he rose from second lieutenant to major. He was elected to the State Senate in 1849 and to Congress in 1864. In 1892 he was the nominee of the Prohibition party for the Presidency.

BIEDERMANN, Friedrich Karl, historian, born at Leipsic, Germany, Sept. 25, 1812; died March 5, 1901. He was educated at the universities of Heidelberg and Leipsic, and in 1838 became professor at the latter institution. This position was lost when he expressed political opinions adverse to the government, but in 1865 he was reinstated. Both as instructor of the university and as editor of a number of liberal newspapers he exercised a wide influence. Among his publications are "Recollections of Saint Paul's Church," "Fifty Years of Public Services," "Philosophy of Kant up to the Present Time," and "Frederick the Great and his Influence in Developing Spiritual Life in Germany."

BIELA'S COMET (bē'lȧ), a comet discovered in 1772, again in 1805, and again in 1826, the last time by an Austrian officer named Wilhelm von Biela (1782-1856), from whom it was named. He calculated its orbit, and showed that the period was six and one-half years. It appeared in 1832, 1839, 1846, and 1852, but since then has not been observed. At its appearance in 1846 it was split into two parts, which phenomenon was also observed six years later. It is thought that the meteoric showers in 1885, 1892, and 1899 were due to the earth passing through the orbit of the lost body.

BIENVILLE (byăn-vēl'), **Jean Baptiste le Moyne,** officer and explorer, born in Montreal, Canada, Feb. 23, 1680; died in France in 1768. He was joined by his brother, Lemoine Iberville, in an expedition to the mouth of the Mississippi River, and in 1699 made a settlement at Biloxi. In 1701 he was made director of the colony and removed the capital from Biloxi to Mobile. He was dismissed from office in 1707, but was reinstated in 1718 by John Law's Mississippi company, and in the same year founded New Orleans and soon after made it the capital. He was again removed as governor in 1726 and reinstated in 1733, and returned to France in 1743. Bienville's policy in respect to religion was one cause of his failure to make the colony a success, as he banished the Jews and prohibited worship except by the Roman Catholics. His code of laws remained in force until the Louisiana territory was acquired by the United States.

BIERSTADT (bēr'stät), **Albert,** eminent artist, born at Dusseldorf, Germany, Jan. 7, 1830; died in New York City, Feb. 18, 1902. When two years old he came with his parents to the United States and early began the study of painting, but returned to Germany to complete his education and later studied in Rome. In 1857 he made an extended tour of the western part of the United States, where he drew inspiration from the grandeur of the natural scenery. In 1867 he was granted the decoration of the Legion of Honor, having become a member of the National Academy in 1860. Among his most famous paintings are "The Valley of the Yosemite," "Looking Down the Yosemite," "California Oaks," and "The Discovery of the Hudson River."

BIGAMY (bĭg′à-mȳ), the offense of marrying while the first wife is still living, or while the first husband is still alive, without first obtaining a divorce. It is defined in the criminal law as a statutory offense and is punishable by fine and imprisonment, or both.

BIG BETHEL (bĕth′el), a village of Virginia, between the James and York rivers, ten miles northwest of Fortress Monroe. It was the scene of an engagement in the Civil War, on June 10, 1861, when Gen. B. F. Butler with 2,500 Federals made an attack upon 1,800 Confederates under Gen. F. W. Pierce. Several attempts were made by the Federals to carry the works by assault, but the attacks were repulsed, and the Confederates retired during the night.

BIG BLACK RIVER, a tributary of the Mississippi, rises in Choctaw County, Mississippi. It is about two hundred miles in length, fifty miles of which are navigable. In 1863 General Grant operated on the banks of this river and carried the works of the Confederates under General Pemberton May 17, and compelled the remaining forces to retreat to Vicksburg.

BIGELOW (bĭg′ē-lō), **Poultney,** author, born in New York City, Sept. 10, 1855. His father, John Bigelow (1817-1911), was part owner of the New York *Evening Post* and prominent in State politics, and provided liberally for his educational advancement. After studying at Yale and Columbia Law School, he was admitted to the bar, but soon gave up his practice for journalism. In 1875-76 he made a tour of the world, visited the shores of New Guinea, traveled in China and Africa, and returned by way of Europe. He crossed the continent of Europe with a canoe, and was the first to pass with that kind of a vessel through the Iron Gates of the Danube. The Royal Geographical Society elected him a member, and he received marks of recognition from many other scientific associations. He lectured at Yale, Columbia, Chicago, Leland Stanford, Jr., Johns Hopkins, and many other universities. During the Spanish-American War he was correspondent to the London *Times.* He was expelled from Russia after publishing "The Borderland of the Czar and Kaiser." Among his other works are "The German Emperor and His Neighbors," "White Man's Africa," "Paddles and Politics Down the Danube," "Children of the Nations," and "History of the German Struggle for Liberty."

BIG HORN. See **Rocky Mountain Goat.**

BIG HORN RIVER, a tributary of the Yellowstone, which rises in the northwestern part of Wyoming, in the Wind River Range. In its upper course it flows toward the southeast, which part is known as the Wind River, then north through the Big Horn Mountains in Montana, and joins the Yellowstone near Big Horn, Mont. The scenery in the upper part of its course is grand. Its length is about 380 miles.

BIGNONIA (bĭg-nō′nĭ-à), a genus of flowering shrubs, so named from the Abbé Bignon. About 100 species have been described, most of which are native to South America. Many are twining shrubs with tendrils and are cultivated extensively in gardens. The *trumpet flower* is a well-known species.

BIG RAPIDS, a city in Michigan, county seat of Mecosta County, fifty-five miles north of Grand Rapids, on the Peré Marquette and the Grand Rapids and Indiana railroads. It is on the Muskegon River, which is crossed by a number of bridges, and is surrounded by a fertile region. The chief buildings include a public library and a courthouse, and it is the seat of the Ferris Institute. The chief manufactures are furniture, hardware, and machinery. Big Rapids was settled in 1859 and was incorporated ten years later. Population, 1905, 4,852; in 1920, 4,553.

BIG SANDY, a tributary of the Ohio River, formed at Louisa, Ky., by the junction of the Tug Fork and West Fork. The West Fork has its source in the southwestern part of Virginia and flows through Kentucky, and the Tug Fork rises in West Virginia. The latter and the Big Sandy form a part of the boundary between Kentucky and West Virginia. The Big Sandy is navigable its entire course of eighteen miles, from Louisa to the Ohio River, and the West Fork is navigable for eighty miles.

BILE (bīl), the fluid separated from the blood of the portal vein by the cells of the liver, where it is collected by the biliary ducts. These unite to form larger ones and finally merge into the right and left hepatic ducts, which unite to form the common hepatic duct. The last mentioned unites with the cystic duct to form the common bile-duct, which opens on the mucous surface of the second part of the duodenum. Bile is secreted continuously, though most rapidly an hour after eating, and a supply is retained in the gall bladder, whence it flows continuously. It is of a golden-red color, and bitter taste, and is somewhat viscid. In the process of digestion, it serves to aid more or less, especially in reducing the fatty substances and stimulating the peristaltic motion of the intestines, and in disenfecting the contents of the large intestine. The amount secreted daily is from twenty to fifty ounces. Gall stones result from solidification of the bile, and biliousness is caused when bile is not secreted in due quantity.

BILL, in legislature, a form of statute proposed for passage in either branch of the legislative department, which, after passing both houses and receiving the executive's signature, becomes a law. In the United States and most countries a bill for raising revenue must originate in the Lower House, but amendments may be proposed and made in the Senate.

Bill, the statement of an account for goods sold, services rendered, or work done, either written or printed. It may state the amount claimed by the creditor in gross or by items. When the term is used to describe a legal or commercial document, it is associated with some other word or words that define its application. The principal kinds of bills are defined in the following list:

Bill of Attainder, a legislative enactment to punish the person or persons guilty of treason or felony, involving the loss of all personal and real property and the infliction of cruel and unusual punishments. A person attainted cannot sue or testify in any court, or claim any civil rights or legal protection, and cannot receive or transmit any property by inheritance. Great Britain abolished bills of attainder in 1870, and the Constitution of the United States prohibits the passage of such a bill.

Bill of Costs, an itemized list of the costs of an action at law. It is filed by the successful party and is subject to the approval of the clerk or some similar officer, and the amount verified is added to the judgment.

Bill of Exchange, a written order signed by the person issuing it, in which another is directed to pay a third party a specified sum of money and charge it to the account of the first. The person issuing it is the drawer; the one receiving it, the payee; and the one to pay it, the drawee, and frequently triplicates are written, one for each of the three parties interested. A foreign bill of exchange is drawn in one state or country and payable in another, and a domestic bill is drawn and payable within a State. Bills of exchange are commonly called drafts, and the largest volume of business in all commercial centers is transacted in drafts and personal checks.

Bill of Exception, in law, a statement of objections made by an attorney in the course of a trial to the ruling of a judge. The objections are made for the purpose of putting the points decided on record so they may be reviewed by the full bench or by a higher court to which an appeal may be taken, and if the exceptions are well founded the case is reversed or remanded for new trial.

Bill of Indictment, a written document presented to a grand jury, accusing one or more persons of having committed a felony or high crime. If the grand jurors consider the evidence sufficient to support the accusation, they indorse it *A true bill,* but if the evidence is insufficient it is marked *Not a true bill.*

Bill of Health, a certificate issued by a consul or other proper officer to the master of a ship clearing out of a port in which contagious diseases are epidemic, or are suspected to be, certifying to the state of health of the crew and passengers on board.

Bill of Lading, a memorandum of goods shipped by vessel bearing the signature of the master of the vessel, who acknowledges the receipt of the goods and agrees to transfer them in good condition to the point of destination, natural damages excepted. The term is applied in the same manner to bills covering shipments made by railroads, but they are frequently called waybills or freight receipts.

Bill of Rights, in government, a summary of the fundamental rights and privileges claimed by the people. The principles of political liberty in Great Britain are defined in the *Bill of Rights* adopted by Parliament in 1689. after the Prince and Princess of Orange became king and queen, and it is one of the three great documents of that country. The first twelve amendments to the United States Constitution are referred to by the same name, since they set forth specifically certain inalienable rights of the people. After the revolution in France, in 1789, a number of bills of rights were enacted by the conventions.

Bill of Sale, a formal statement issued as evidence of the sale of personal property. Such an instrument is necessary when the property sold does not pass into the possession of the purchaser, but remains in the custody of the party who sold it. To make such a bill valid in some states or countries, against the claim of a third party, it is necessary to have it recorded in the public records of the town or county. A bill is frequently given to a creditor as security for borrowed money or as surety that an account will be paid.

BILLIARDS (bĭl'yẽrdz), an indoor game played with ivory or paste balls on a rectangular table. The balls are driven by a cue made of an ash rod or stick against each other or into pockets. The game is one of the most popular and extensively played of all indoor games. Rules and regulations guide the player in the manner of driving the balls and in the number of points to be made. Among the games played are the *five-pin pool, fifteen-ball pool, Chicago pool, bottle pool, Parisian pool,* and many others variously designated. The origin of the play dates far back in history. Contests for the world's championship are frequent.

The table used in playing billiards is covered with cloth, has raised, cushioned edges, and its dimensions are about six by twelve feet. The cue is a straight, round staff of wood from four to eight feet in length, tapering from the butt to the tip, and tipped at the point with a thin leather, which is chalked to cause it to take hold of the smooth and polished surface of the balls. The balls are usually of ivory, measure two and one-sixteenth inches in diameter, and are differently colored. A popular game is played with three balls, one red and two white, and one of the white balls has a spot to distinguish it from the others. At the beginning of the game the red ball is placed upon the top of the table, at a point about twelve inches from the top cushion and in the center width of the table, and the other two balls are placed at different points at the opposite end of the table. The game is won or lost according to the ability of the players to strike their own ball against that of the adversary or the red ball so either may be driven into the pockets, or to strike both balls with that of the player. In America the game is played very generally with three balls on tables not provided with pockets, and the object of the player is to effect a *cannon,* that is to drive his own ball so it will strike the red ball and that of his adversary.

BILLINGS (bĭl'lĭngz), a city in Montana, county seat of Yellowstone County, 240 miles southeast of Helena, on the Northern Pacific and the Chicago, Burlington and Quincy railroads. It is nicely situated on the Yellowstone River, which furnishes an abundance of water for irrigation. The surrounding country is well adapted to stock raising. As an inland market for wool it takes high rank, and much live stock is shipped to domestic and foreign points. Coal is mined in the vicinity, and marble and limestone quarries are worked profitably. A public library, a city hall, an opera house, a courthouse, and numerous schools and churches are among the public buildings. It has a growing trade in merchandise. Population, 1900, 3,221; in 1920, 15,100.

BILLINGS, John Shaw, surgeon and librarian, born in Switzerland County, Ind., April 12, 1838. He was educated at Miami University and at the Ohio Medical College, and after graduating at the latter, in 1860, he was appointed active assistant surgeon in the army. In 1863 he was with the army of the Potomac, serving at the time in the battles of Gettysburg and Chancellorsville, and the following year was attached to the surgeon general's office in Washington, where he was curator of the Army Medical Museum Library. Subsequently he was professor of hygiene at the University of Pennsylvania, served as librarian of the New York public library, and took an active part as a member of several distinguished foreign medical associations. Besides publishing many reports upon the mortality and vital statistics of the United States, be issued "Description of the Johns Hopkins Hospital," "Principles of Ventilation and Heat," "National Medical Dictionary," "Social Statistics of Cities," and "Index-Catalogue of the Surgeon General's Office." He died Mar. 11, 1913.

BILLINGS, Josh. See **Shaw, Henry Wheeler.**

BILLINGSGATE (bĭl'lĭngz-gāt), a wharf and fish market in London, England, located near the London bridge, on the Thames. This market was established in 1699, and has continued to be free and open for the sale of all kinds of fish. The term *billingsgate* originated from this market, due to the coarse or abusive language heard there in former times.

BILOXI (bĭ-lŏks'ĭ), a city of Mississippi, in Harrison County, on the Gulf of Mexico, and on the Louisville and Nashville Railroad. It has a well improved harbor and is the seat of several schools and a convent. It carries a large trade in fruit, vegetables, oysters, and merchandise. The canning industry is a growing enterprise, and large quantities of canned goods, such as oysters, crabs, fruit, and vegetables, are exported. Shipyards and machine shops are growing enterprises. The first settlement in its vicinity was made across Biloxi Bay, on which the city is located, by a company of French under Iberville and his brother, Jean Bienville (q. v.), in 1699, and named from the Biloxi Indians. Its growth is due to its convenient location as a trade center, and as a popular winter resort. Population, 1900, 5,467; in 1920, 10,937.

BIMETALLISM (bī-mĕt'al-lĭz'm), the doctrine that both gold and silver should be adopted at the same time, in the same country, as standard money, and bear to each other a fixed ratio established and recognized by the government. It is opposed to monometallism, which is the doctrine of a single monetary standard. The two doctrines have caused political dissension in all civilized countries. The contention reached the culminating point in the United States in 1896, although much discussion was given to this phase of the money question from the early organization of the government. Bimetallists contend that the coinage of gold and silver should be alike free and unlimited, that the coined metals should bear to each other a fixed value, which, when so fixed, will be maintained by reason of the law and commercial necessity; both metals should be equally standard money, full legal tender for all debts private and public, and should be the basis of the entire monetary system. The parity of both gold and silver has been disturbed by various causes, such as the adoption of the single gold standard in some countries, whereby the demand for gold was correspondingly increased; the discovery of large quantities of gold and silver, whereby the relative quantity of the world was varied; and the demonetization of silver in a number of countries, whereby the use of silver was materially limited.

The proper ratio of the coinage is generally held to be about sixteen to one by the advocates of bimetallism, for the reason that the production of silver in the world has been in weight about sixteen times that of the production of gold. However, other ratios are advocated and have been maintained. The *battle of the standards,* as the conflict between the two doctrines is called, owes its origin largely to the discovery of vast gold fields in California in 1849 and in Australia in 1851.

The relative values of gold and silver from 1600 B. C. to the beginning of the Christian era stood about as one to twelve to each other, never falling below one to nine and never exceeding one to fourteen. From the Christian era to 1640 A. D. the ratio of the market value of gold and silver stood from one to ten to one to fifteen, while from 1640 to 1872 it stood uniformly from one to fourteen to one to sixteen. A legal ratio of one to fifteen and one-half was long maintained by a number of European governments. The greatest variations in ratio have occurred since 1872. The partial demonetization of silver in the United States in 1873 caused the ratio to be about one to twenty-three, and with the act of 1878, which partly restored silver, the ratio stood at one to seventeen. Since that time, owing to legislation and the discovery of vast quantities of gold in South Africa and the northwestern part of North America, the value of silver has fallen until it has reached about one to forty. See **Money.**

BINDING TWINE, an article of commerce which attained its greatest utility with the general use of the self-binding harvester. The best quality is made of Manila hemp produced in the East Indies, particularly that secured of the banana palm, which abounds in the Philippine Islands. Other hemp of use in its manufacture grows in Yucatan and Southern Mexico. The sisal twine is secured from the American aloes. The binding twine sold on the market is wound into balls of 650 feet each, so wrapped that they unwind from the inside.

BINET (bē̍'nā̊), **Alfred,** psychologist, born in Nice, France, July 8, 1857. He studied in his native town and in Paris, took a course of study in law and medicine, and in 1880 began an extensive investigation of experimental and pathological psychology. His study and publications relate to psychological subjects, of which he was an original investigator, and he was for a long time director of the laboratory of psychology at the Sorbonne in Paris. Besides contributing many articles to periodicals devoted to scientific research, he published and translated extensively, his works dealing exhaustively with psychological subjects.

BINGEN (bĭng'en), a city in the grand duchy of Hesse, Germany, on the Rhine, 20 miles west of Mainz. It is surrounded by a fertile country which produces a superior quality of grapes and cereals. The manufactures include wine, leather, woolen goods, and clothing. It has a number of fine public buildings and a growing trade. The Mäusethurm Tower rises from the middle of the Rhine, a little below the city. It was erected about the 10th century by Willigis, Archbishop of Mainz. It is celebrated on account of the legend that Bishop Hatto was eaten by rats, which were attracted to the tower by large quantities of grain stored by him during a famine. In legendry it is recited that the treasures of King Nibelung were sunk in the Rhine near Bingen, from which the name was given to the Nibelungenlied. The place is also famous for the popular school song, "Bingen on the Rhine." Population, 1921, 10,260.

BINGHAM (bĭng'am), **John Arende,** jurist and legislator, born in Mercer, Pa., in 1815; died March 19, 1900. He studied at Franklin College, Ohio, and in 1854 was elected as a Republican to Congress, serving consecutively until 1863. In the latter year he was made judge-advocate in the army, had charge of the trial of Lincoln's assassins, and served in Congress from 1865 until 1873. He was one of the attorneys in the impeachment proceedings against Andrew Johnson. In 1873 he was made United States minister to Japan and served continuously for twelve years.

BINGHAMTON (bĭng'am-tŭn), county seat of Broome County, New York, on the north branch of the Susquehanna River. It is on the Delaware and Hudson, the Lackawanna, and other railroads, and occupies a fine site overlooking the Susquehanna and Chenango rivers, which unite in the city. Bennett Park and Ross Park are fine public grounds. It has a modern courthouse, post office, high schools, opera house, and city hall. It is the seat of the New York State Asylum for Inebriates, Binghamton Academy, Susquehanna Valley Home, and Saint Mary's Home for Indigent Children. The manufactures include machinery, clothing, furniture, cigars, shoes, and farming implements. The city has electric street railways, waterworks, gas and electric lighting, and fine public schools. It was founded in 1787 by William Bingham, incorporated in 1818, and made a city in 1867. Population, 1925, 71,915.

BINNEY (bĭn'nĭ), **Horace,** jurist, born in Philadelphia, Pa., Jan. 4, 1780; died Aug. 12, 1875. He graduated with honors at Harvard University, was admitted to the bar, and in 1833 was elected to Congress, where he opposed Andrew Jackson in the affairs of the United States Bank. Subsequently he practiced law and became noted on account of his able argument before the Supreme Court on a question relating to the legality of the bequests of Stephen Girard (q. v.). He published "Life and Character of Chief Justice Marshal" and "The Privilege of the Writ of Habeas Corpus Under the Constitution."

BINOMIAL (bī-nō'mĭ-al), in algebra, an expression that consists of two terms, such as a+b or 7—3; a *trinomial* consists of three terms, as a+b+x, or 5+3—2. An algebraic expression consisting of three or more terms is called a *polynomial.* Sir Isaac Newton was the first to employ the binomial theorem, using it to raise a binomial to any power or extracting any root of it by approximating series. The discovery is engraved on his tomb.

BIOBIO (bē-ō̍-bē'ō̍), the largest river in

Chile, rises in the Andes, and after a course of 200 miles discharges into the Pacific near the city of Concepcion. At its mouth it is about two miles wide.

BIOGRAPHY (bī-ŏg′rȧ-fy), the department of literature which treats of the lives of individuals. When written by the subject himself, it is called *autobiography*. Biography differs in its mode of treatment in that it assumes the form of descriptive criticism, or approaches the sphere of history or philosophy. Modern biography includes numerous criticisms and elucidations, and differs from the classic in that it is more acute, expansive, and lively. Modern biographies are very numerous, and many of them possess remarkable literary charms, partake of the eminent character of their subject, and throw a light of interest about men and the events of their times. Among the early biographies are Plutarch's "Parallel Lives," written in the 1st century after Christ; Nepos' "Lives of Military Commanders," and Suetonius' "Lives of the Twelve Caesars." Biographical literature of modern times originated in the 17th century, since which time it has multiplied extensively and entered largely into the popular writings. In 1671 the publication of biographical dictionaries was inaugurated by Moreri, who published "Dictionnaire Historique et Critique." In the last century numerous publications of merit were completed and extensively circulated. Many of them contain encyclopaedic treatises and constitute practically universal biographies. Dr. Johnson thought every man best fitted to write his own life, and yet the best biography ever written is, perhaps, that of Dr. Johnson, as written by Boswell.

BIOLOGY (bī-ŏl′ō-jy̆), the science that embraces all phenomena of life. It includes the scientific inquiries into the first origin of life and its various changes from the earliest period until now. Some of the phenomena of life, including psychology, the study of the human soul, and sociology, the study pertaining to man in society, are often grouped apart, but these and all phenomena of life properly belong to biology. Biology was not recognized as an important science until the latter half of the 18th century, nor was it thought possible until comparatively recent times to deduce laws which would equally pertain to all forms and manifestations of vegetable life. By means of a general tendency to inductive reasoning and the work of some scholars, as Cuvier, Lamarck, Darwin, Kant, von Baer, and numerous others, it has become possible to define all life with one definition, and classify its laws uniformly, no matter in what shape or function we find it.

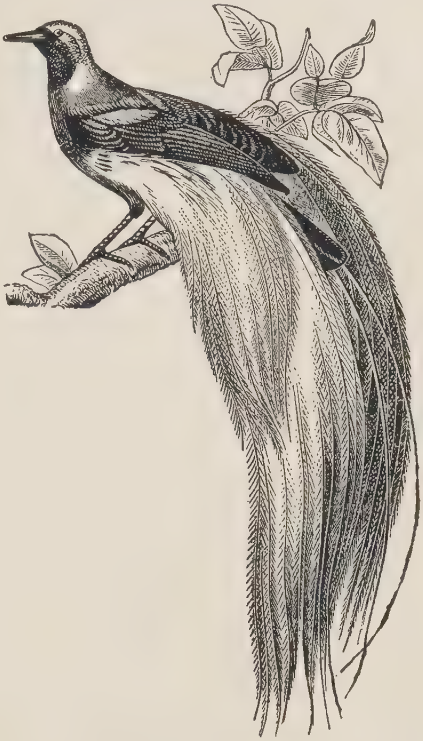
All living matter has three distinctive properties. The first of these is its *chemical composition,* which invariably contains one or more forms of a complex compound of oxygen, hydrogen, nitrogen, and carbon, called the *protein* and found only as a product of living bodies. The protein is united with a large proportion of water and forms a kind of fluid called *protoplasm.* The next distinctive property is the *universal waste* by being oxidized, and its conjoined restoration to a whole state by the infusion of new matter. Life is always attended by the decomposition of molecules of protoplasm. The waste products consist largely of carbonic acid, while the other elements of protein enter into the composition of protoplasm. The new matter is supplied by some other living being, or contains elements of protoplasm which go to build up the living matter. The addition unites with the existing molecules of the living mass by *interposition.* While in the stage of infancy the reconstruction exceeds the waste, the two are balanced at a period of complete development, and later the waste exceeds the reconstruction. When reconstruction exceeds the waste, the living mass grows, but when waste exceeds it, it begins to decline and death eventually results. The third distinctive property is that all living matter tends to undergo *recurring changes,* or life proceeds from *preëxisting life;* in animals the new life is born from eggs, while in plants, from seeds. Varied forms propagate themselves by offshoots, which, like their predecessors, after a time cease to live and resolve into oxidated elements. New forms in life invariably partake of the characteristics of the forms from which they originated, although by a process of propagation changes to a higher or lower state may be effected.

All living matter depends upon a supply of heat and moisture, which dependence varies in kind with its organization and structure. Life forms cannot exist unless surrounded by a temperature suitable to their growth and development. Movement, nutritive growth, and reproduction are possible only within certain limits of temperature, which, when excessively raised or lowered, cause death. The minimum limit of temperature that living matter can bear is greatly variable, depending upon the nature of the life. Pasteur found that the spores of fungi, when dry, could be exposed to a temperature of 250° Fahr., while when moistened they were killed at 112°. Bacteria lose life at 14° above zero, while experiments with other forms of life show that the power to resist cold is very various. On the other hand, the maximum limit of heat at which living matter can exist is equally variable; some forms of marine life are able to withstand a temperature of only 95°. The simpler forms of vegetable organisms lose life at a temperature of 140°. However, there are thermal springs with a temperature of 168° to 208° in which living plants are found. Scientists ascribe their ability to withstand this high temperature to habit, this having been formed by slow degrees through long periods of time. Life does not always cease with destruction of form, but often becomes extinct only with coagulation of certain substances in the protoplasm.

Numerous forms of life are invisible to the naked eye, in many of which the most powerful microscope does not reveal the vital parts. The living forms that are found to contain different parts, with distinct functions, when examined by the microscope, are said to be organized living bodies. However, life extends beyond organized forms. Besides, there are bodies of considerable size that manifest such a peculiar structure that it is difficult to determine whether they are plants or animals. The most important distinction among animals is in the food partaken. Animals feed upon plants and other animals, and breathe in oxygen; while plants take in food from the earth and the air by means of their roots and leaves. The divisions of biology are *morphology, distribution, physiology,* and *aetiology.* The first relates to the anatomy and history, the second to geography and geology, the third to organic functions, and the last to the causes and origin of life. The study of plant life is called *botany;* of animal life, *zoölogy.*

BIRCH (bẽrch), a genus of trees found in the colder regions of America and Eurasia, including no less than 25 species. In the temperate climates they attain a height of seventy feet, while in cold climates, as in Greenland, they dwindle down to a mere bush, known as the *dwarf birch.* The wood is tough, firm, and light in color; the bark is smooth, shining, and whitish or a chalky white. It is one of the most useful of woods. The bark is used by savages in building huts and canoes, and by civilized people for tanning and in the production of valuable oil. Birch wood enters into the manufacture of furniture, wooden shoes, barrels, and water wheels, and is used for construction purposes. It is found farther north in North America than any other tree, and is the only tree in Greenland. For this reason it serves a valuable purpose as fuel in the cold regions inhabited by the Laplanders and Eskimos. The *white birch* and the *yellow birch* are familiar trees in many parts of Canada and the United States.

BIRD OF PARADISE (pâr'á-dīs), a bird of beautiful plumage allied to the crows, found chiefly in New Guinea and the adjacent islands. The family includes a number of species, some of which are remarkable for beauty in color and plumage. The *king bird of paradise* has a magnificent plume of feathers, which comes up from under the wings and branches over the back. It is the most beautiful bird of this family and is quite rare. Other species include the *red bird of paradise,* the *golden bird of paradise,* and the *emerald bird of paradise.* Most of these birds are small; the largest species attain a length of about two feet. The plume is found only in the male, whose feathers form an article of commerce. It is used for ornamentation and for trimming hats. The plumage is so rich and varied that in this respect these birds excel all others, even the humming birds. Knowledge of these birds dates from 1857, when A. R. Wallace discovered them while on a voyage to Australasia.



KING BIRD OF PARADISE.

BIRDS, the second class of the subkingdom of vertebrate animals, which stands between the mammals above and the reptiles below. They agree with the mammals in being warm-blooded and with the reptiles, amphibia, and fishes in being oviparous, that is, their young are born from eggs, while the mammals bring forth their young alive and suckle them for a time. They are bipeds and are feathered, and wings are used by all but a few species in flight. The blood circulates rapidly and is warmer than in other vertebrates, and consequently they are animals of great energy. They breathe not only through the lungs, but have air cells in various parts of the body, which aid in respiration. The feathers essentially resemble hair of other animals, and are found only in the bird class. The plumage on the lower parts of the body of most birds is formed by a thick coating of feathers embedded in the skin, called *down.* The shape, the light feather coating, the powerful wings, the peculiar tail, the air cells, and the strong muscles are important factors in fitting them for flight. Their feathers are renewed periodically;

the plumage of winter in many species differs from that of the summer time. The young change their plumage many times before they attain their full-grown shape.

The lightness of birds enables them to fly, swim, and move rapidly on land. Their bones are thin and contain numerous air cells, while air is also found in the feathers and and in various parts of the body. The swift-flying birds have more air cells than those of slower flight, while birds that do not fly possess very few, as the ostrich, which has cells only in the thigh bones. In breathing, the air passes from the lungs into the cells at will; some birds have the capacity to fill even the quills of large feathers. All this and the long feathers of the tail and wings aid in carrying the birds through the air. Birds of colder regions are covered with much warmer coating than those of hot climates; this is necessary owing to a need of greater ability to withstand the cold.

The food of birds differs widely. Some live on a mixture of plant and animal food, while others live entirely on insects and some entirely on flesh. The food is swallowed in large particles, or whole, and passes through the gullet into the first stomach, or crop, in which it is softened by soaking. It then passes by another part of the gullet into the gizzard, a strong and muscular cavity, in which it is mixed with gastric juices. The grain-eating birds have a large crop into which the seeds swallowed by them pass, where they are moistened by a liquid secretion. The strength of the gizzard depends upon the kind of birds; those that eat flesh have a weaker gizzard than those that eat plants and seeds. It is to be noted that the gizzard has a grinding motion and crushes the food, and to facilitate this action many birds swallow small stones. The intestines are smaller and simpler than those in mammals, but in the main all the organs, like the kidneys, gall bladder, and other vital organs, are common to them.

Birds possess all the senses, more or less fully developed. The senses of touch and taste are quite dull in all the birds, while the senses of sight and hearing are highly developed. Birds of prey possess a strong sense of smell. Many birds have no song, but all are known to be able to make a noise or cry. Only the male birds possess the power of song, but females have ability to call other birds. When domesticated, the song is beautified and enlarged, but birds of the finest plumage are not the best singers; their richness in dress is compensated for by the song in the plainer birds, a truly admirable compensation. Many birds migrate in the spring to the colder regions and return in autumn, but there are also summer birds of passage.

In nest building there is a wide range of difference. Some lay their eggs on the warm sand of the seashore or on desert oases, while others build nests in trees and bushes, or burrow in the banks of rivers or oceans. The eggs are hatched by incubation; that is, by sitting on them and keeping them warm until young birds are produced, but there are some birds that lay their eggs to be hatched by the warmth of the sun or the heat generated by decaying vegetation. The mother bird guards the nest at short range, while the males are seen at some distance watching the enemy. Many kinds of young birds are able to leave the nests and gather food for themselves shortly after hatching, but the young of some species are fed for days and even weeks.

For the purpose of study there are various divisions of birds, but the following seven are those commonly given:

1. *Raveners (raptores)* are birds of prey. They have strong, curved beaks with sharp edges. Their feet possess claws with sharp hooks, useful in catching and destroying other animals, and their wings are well developed for flight. This class includes such birds as owls, vultures, hawks, and eagles.

2. *Climbers (scansores)* are birds that climb, such as the woodpeckers, toucans, parrots, and cuckoos. Their power of flight is not well developed, but they possess feet and toes well adapted for climbing and moving about on the limbs of trees.

3. *Perchers (insessores)* are the birds that perch habitually among trees. This class of birds includes all the birds of song and most birds that live in trees. It constitutes the most numerous order.

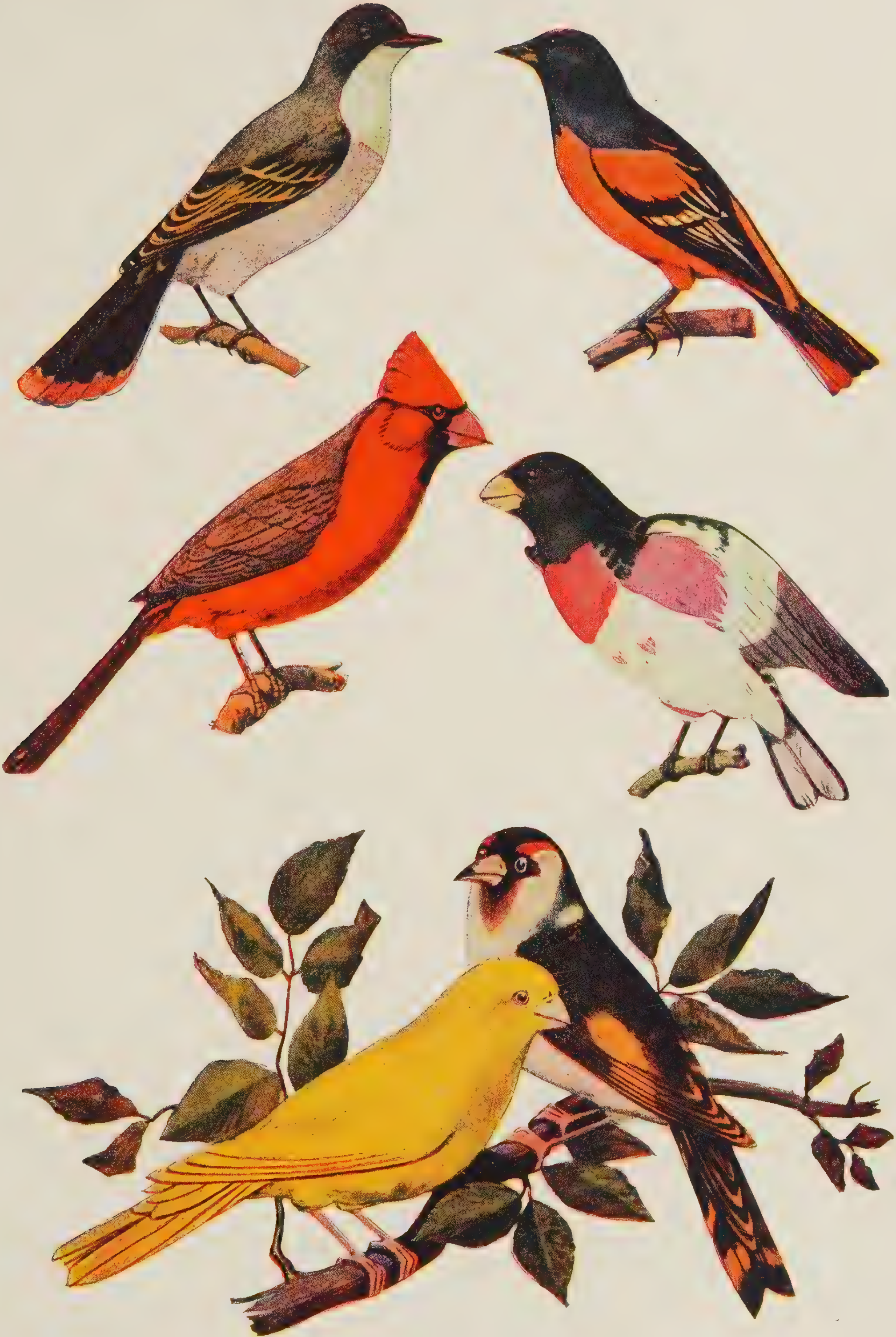
4. *Runners (cursores)* include the emu, ostrich, and cassowary. Their wings are rudimentary and useless for flight, while their legs are powerful. They are otherwise distinguished by their breastbone being without a keel and their hind toes wanting.

5. *Scratchers (rasores)* embrace the domestic pigeons, fowls, and pheasants. The bill is short and thick, the legs are strong and large, and the feet are suitable for scratching.

6. *Waders (grallatores)* include the snipes, herons, sandpipers, cranes, and many others. Their legs are long and destitute of feathers above the heel, and their toes are usually half webbed. The bill is long and slender, adapted for fishing under water.

7. *Swimmers (natatores)* are web-footed birds, as gulls, geese, swans, and ducks. The feet are webbed; that is, the toes are connected by membrane and formed for swimming. Most species have flattened bills, and are expert divers.

BIRDS' NESTS, the habitations of birds, in which they lay their eggs and hatch their young. In the construction of nests birds differ largely, from the rude and simple to



(Opp. 298)

FAMILIAR BIRDS.

Kingbird.
Cardinal Bird, or Cardinal Grosbeak.
Canary.

Baltimore Oriole.
Red Breasted Grosbeak, or Hawkfinch.
Goldfinch.

the wonderful and skillful. Two classes of birds are usually recognized by writers, including those that build their nests in trees and structures above the ground and those that build in cliffs or on the ground. Nearly all birds that swim and dive, and those that live along the shore, build their nests on the ground. Some birds lay their eggs on rocky cliffs or in the sand on the shore of the sea or inland lakes. The nighthawks and whip-poor-wills lay their eggs on dry leaves or on the roofs of houses. Many water birds build nests by means of sticks and leaves entwined among the reeds of swamps. This class usually feather their nests with the down taken from beneath the breast.

Writers have divided birds into different classes, using the kind of nests they build as a basis for classification. Such birds as the canary are called *felt-makers,* because they weave their material much like the fibers of felt are arranged. Some of the birds in India are classified as *tailors,* because they sew leaves together and build their nests in a pouch-like formation, hanging downward. Many species of birds, including the mocking bird, red-winged blackbird, and many others, are classified as *basket-makers*, because they construct basket-shaped nests that resemble the seed-vessels of plants in which they build, to deceive those who chance to visit the locality in search of eggs. *Platform builders* are such as the pigeon and eagle, which arrange platforms on the branches of trees to utilize them for the nests and for perching. *Mining birds* dig holes in the ground, or use the holes made by other animals for the purpose of making nests. A small owl of the western plains is a good example of this class. It lives with prairie dogs and hatches its young in their holes, and is closely associated with snakes. *Mason birds* build nests in cliffs and under the eaves of houses, constructing them of mud in the shape of a flask. *Carpenter birds,* such as woodpeckers, chop holes into the trunk or limbs of trees and build their nests in airy tunnels. *Ground-builders* make their nests in small holes in the ground, usually under a tuft of grass or near a large stone. The subject of birds' nests is an interesting study. However, it is remarkable that birds of all classes, no matter where found, construct the same kind of nests, and that there is no change or improvement in the construction. Cuvier asserted that birds known to the Egyptians and Babylonians built identically the same kind of nests as those that live at the present time. Many birds can be induced to nest in small houses constructed for them and placed in a convenient locality of the barn or house yard.

BIRDS OF PASSAGE, the birds that migrate from warmer to colder climates, and from colder to warmer climates; these include two classes, known as *winter birds of passage* and *summer birds of passage.* Winter birds of passage migrate in the spring toward the polar regions to breed, and return toward the warmer zones in autumn, while the summer birds of passage pass toward the colder regions in the fall and return toward the warmer in the spring. These classes vary according to the different latitudes. The wild duck and the goose are familiar winter birds of passage, while the robin is a good example of the other class in some countries. Among the birds that do not migrate may be mentioned the quail, grouse, and snowbird.

BIRKENHEAD (bẽrk′en-hĕd), a seaport of England, on the estuary of the Mersey, opposite Liverpool. It has a large steamship and railway commerce and an immense jobbing trade. Engineering and shipbuilding are its principal industries. It has communication with Liverpool by a ferry owned by the municipality, and a railway tunnel under the Mersey 30 feet below the bed of the river. The tunnel is 36 feet wide and 22 feet high, and was constructed at a cost of $6,250,000. The city has fine public baths and a public library, and is the seat of Saint Aidan's College. Among the chief buildings are the city hall, the market hall, and many villas and churches. The city dates from the 12th century, but its importance as a trade center began with the latter part of the last century. Population, 1907, 118,553; in 1921, 130,832.

BIRMINGHAM (bẽr′-mĭng-ȧm), county seat of Jefferson County, Alabama, 95 miles northwest of Montgomery, on the Southern, the Central of Georgia, the Louisville and Nashville, and other railroads. It is located in a beautiful valley about 600 feet above the level of the sea. The city is surrounded by the richest iron and coal region of the State, contains blast furnaces and rolling mills, and has extensive interests in manufacturing. Steel products are made in large quantities from ore found in the vicinity. Among the general manufactures are cotton-seed oil, car wheels, engines, and boilers, cotton goods, earthenware, and machinery. It has many large buildings, such as the American Trust, the Age-Herald, the Brown-Marx, and the Empire buildings. Lakeview and Capital parks are fine public grounds. The streets are paved with stone and asphalt. Other public improvements include electric street railways, sewerage, a public library, and city waterworks. Howard College, a Baptist institution, is five miles northeast of the city. Birmingham is one of the most prosperous cities in the South. In 1880 it had a population of 3,886; in 1890, 26,241; and in 1900, 38,415; in 1920, 178,270.

BIRMINGHAM, an important manufacturing city of England, in Warwick County, 112 miles northwest of London. It is celebrated for its immense production of metal ware. Over 10,000 workmen are engaged in the maufacture of brass products, while large numbers engage in manufacturing firearms, steam engines, sewing machines, railroad cars, gas fittings, swords, articles of papier-mache, and other products. It has connection by many lines of steam and electric railways. The Central Railway Station covers about thirteen acres of ground. Among the chief buildings are the post office, the city hall, the Anglican Church of Saint Martin, and the Baptist Wyclif Chapel. It is the seat of Mason and Queen's colleges and other educational institutions. Among the memorials are beautiful statues of Sir Robert Peel and Nelson. The city contains seven districts, from each of which a representative is sent to Parliament. Population, 1921, 825,960.

BIRNAM (bĕr′nam), a hill of Scotland, in Perthshire, twelve miles northwest of Perth. From its summit, 1,580 feet above the sea, a fine view of the Tay River and valley is afforded. Formerly it was covered by a royal forest made famous by Shakespeare in "Macbeth."

BIRNEY (bĕr′nĭ), **James Gillespie,** a public man, born at Danville, Ky., Feb. 4, 1792; died Nov. 24, 1857. He advocated the abolition of slavery. His journalistic career was disturbed by violence from many who differed from him on the slavery question, but he persevered and was soon made secretary of the American Antislavery Society. In 1840 and 1844 he was the candidate for President of the Liberty party.

BISBEE, a city of Arizona, in Cochise County, 10 miles from the Mexican border, on the Southern Pacific Railroad. It is surrounded by a rich copper producing country. The features include the high school, city hall, public library, Y. M. C. A. building, brick paving, and sanitary sewerage. The monthly pay roll of the copper camps is about $500,000. Population, 1920, 9,205.

BISCAY (bĭs′kȧ), a large bay on the western coast of Europe, forming the principal eastern boundary of France and the northern boundary of Spain. Its French coast is low, but the Spanish coast rises in rocky cliffs. Navigation is dangerous, owing to storms and breakers. The tide sweeps to a height of forty feet. The water from the Garonne and Loire flows into it. On its shores are numerous seaports, including Nantes, Brest, Bordeaux, and Gijón.

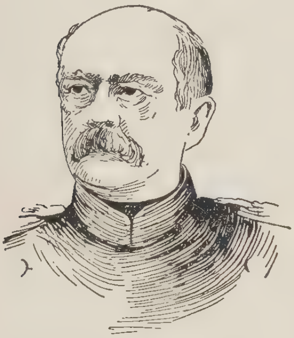
BISCAY, or **Vizcaya,** a province of Spain, in the northern part, one of the so-called Basque provinces. It has an area of 836 square miles. The surface is mountainous. Bilboa is the capital and largest city. Other cities include Orozco and Bermeo. Population, 311,361. See **Basques.**

BISCUIT (bĭs′kĭt), a kind of bread formed into small cakes, either fermented or unfermented, and made chiefly of wheat and rye flour. Many kinds of biscuits are made in large bakeries for the trade and sold on the market, both in bulk and in small packages designed for household use. The work of kneading, cutting, and stamping is done almost exclusively by machinery, and an oven serves to turn out about two thousand pounds of biscuit in a day of nine hours. Biscuits are baked so they become hard and dry, hence may be kept without spoiling for a long time. *Sea biscuits* are made of flour, water, and salt and keep easily for two years. The biscuits of the market are made chiefly of flour, butter, eggs, soda, and salt, the proportions of the ingredients used depending upon the kind and quality desired, and in making sweet biscuits sugar and flavoring are used. To make soft biscuits larger proportions of sugar and butter are required. *Meat biscuits* are made of wheat flour and the soluble parts of meat. In Scotland some varieties are called *bakes*, while *crackers* is the name usually applied in America.

BISHOP (bĭsh′ŭp), a title applied to the highest order of the clergymen in the Christian church. In the Roman Catholic, Protestant Episcopal, and Greek Catholic churches bishops claim apostolic succession. In the Methodist Episcopal and other churches less formal dignity is maintained and no claim is made to apostolic succession. In Great Britain the bishops of the Church of England are called lord bishops. Two of the archbishops and a number of the bishops of Wales and England have seats in the House of Lords. The general duties of bishops vary greatly in different denominations, but usually include the power to appoint clergymen to churches, the dignity to preside at conventions of the clergy, and oversight over the churches and the clergy within the diocese.

BISMARCK (bĭz′märk), capital of North Dakota, county seat of Burleigh County, on the Missouri River. It occupies an elevated site on the Minneapolis, Saint Paul and Sault Sainte Marie and the Northern Pacific railroads. The chief buildings include the high school, the county courthouse, the State capitol, the State penitentiary, the State library, and the State Memorial Building. It has electric lights, waterworks, and fine schools and churches. It is surrounded by a fertile region and is a market for large quantities of wheat, oats, potatoes, and merchandise. The industries include flouring mills, machine shops, and grain elevators. It was settled in 1873 and became the capital of the State in 1889. Population, 1925, 9,150.

BISMARCK ARCHIPELAGO (bĭs-märk), a group of islands in the Pacific Ocean, about 56 miles east of New Guinea. The principal islands were formerly known as New Britain, New Ireland, and Duke of York, but when the archipelago became territory of Germany, in 1884, the names were changed respectively to Neu Pommern, Neu Mecklenburg, and Neu Lauenburg. The possession contains a large number of islands, but those named are the principal land masses of the group, and the total area is about 18,500 square miles. Copper and trepang are exported, and the trade in fruit and merchandise is important. The government, since 1919, is administered by Australia. Population, 212,000.



PRINCE VON BISMARCK.

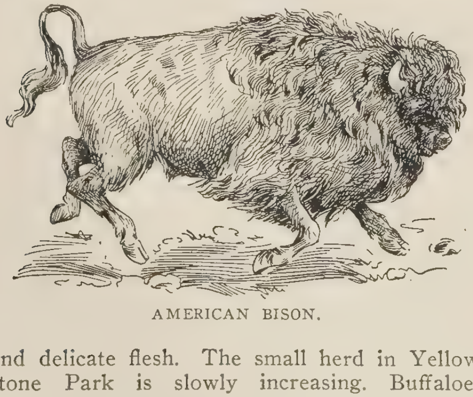
BISMARCK - SCHONHAUSEN (bĭs′-märk-shĕn-how′zen), **Karl Otto Eduard Leopold, Prince von,** greatest European statesman of the 19th century, born at Schönhausen, in Brandenburg, Germany, April 1, 1815; died July 30, 1898. He was a descendant of ancestors whose lineage is traced back to the middle of the 16th century. His education was received at Göttingen, Berlin, and Greifswald. He first became known in 1847 as a member of the Prussian Parliament, where he took an active part as an ultraroyalist. He was appointed Prussian member of the German Diet at Frankfort in 1851, from which his diplomatic career dates. His zeal for the enlargement of Prussian power led to a rupture with Austria at the time that country became involved in a war with Italy and France. In 1859 he became minister to Saint Petersburg, when he strengthened the relations between Russia and Prussia, and in 1862 was transferred to Paris. While at Paris he made an official visit to London, where he met the leading English statesmen of his time. From Paris he was recalled to take charge of the portfolio of minister for foreign affairs, and the presidency of the cabinet. The lower house refused to pass Bismarck's bill for the reorganization of the army, which caused him to dissolve it at once, and he governed without a budget during four succeeding sessions. Public excitement was at the greatest height of intensity when the Schleswig-Holstein question diverted the strain, and he succeeded in adding the province to Prussia. Soon after new complications caused the Seven Weeks' War with Austria, which ended with Prussian triumph at the Battle of Königgrätz in 1866, and was followed by the reorganization of Germany, under the guiding spirit of Bismarck and the leadership of Prussia. When Prince Leopold of Hohenzollern was proposed for the throne of Spain, the unfriendly feeling between Germany and France was intensified and brought on the War of 1870-71. After the splendid victories of the German armies Bismarck dictated the terms of peace in the Treaty of Frankfort, May 10, 1871, by whose provisions Germany recovered Alsace-Lorraine and received a cash indemnity of $1,000,000,000 in gold.

In 1871, immediately after the establishment of the new German Empire, he was created prince and chancellor. His policy having been vindicated, he directed his attention to the enlargement of the army and navy, codification of the laws, reformation of coinage, civil reform, the introduction of a protective tariff, and the state control of railroads. In 1884 he began to advocate the colonizing powers of Germany, which led to a temporary conflict with England, and this, together with other acts, tended to isolate France. He resigned the offices of prime minister and chancellor in 1890, owing to a divergence between him and Emperor William II., but he continued to influence the German policy and the affairs of Europe. He was presiding officer at the Berlin Congress in 1878, of the Berlin Conference in 1880, and of the Congo Conference in 1884. The occasion of his departure from Berlin caused a great popular demonstration, which gave evidence of his intense popularity among the people. On March 26, 1895, he was visited by Emperor William II. at his own home in Friedrichsruhe on the occasion of his eightieth birthday. Owing to his wisdom in building a great empire from a number of scattered states, and exercising a lasting influence on the politics of Europe, he was called *Iron Chancellor.* The advancing ages of history will increase his fame. He was truly a man of power and a statesman of ability, and rendered practical service to his country and to civilization in its broadest sense.

BISMARCK-SCHONHAUSEN, Wilhelm Albrecht Otto, born in Frankfort-on-the-Main, Germany, Aug. 1, 1852; died May 30, 1901. After receiving instruction under private tutors and institutions of secondary education, he took an extensive course at the University of Bonn. In the War of 1870-71 with France he was an officer of ordnance. Subsequent to the war he entered the civil service, and in 1879 became secretary to the governor of Alsace-Lorraine. His efficient service caused him to be promoted successively, and in 1889 he was made president of the province of Hanover and governor of East Prussia, which positions he held until his death.

BISMUTH (bĭz′mŭth), a brittle metal of a reddish-white color and crytalline texture. It is somewhat harder than lead and can be reduced easily to powder when cold by means of a hammer. In a native state it frequently consists of crystallized rhombs, but also exists with other metals, especially gold, sulphur, arsenic, and oxygen. It is useful in making printers' type, ink, and medicines, and in assaying gold and silver by cupellation. A compound of three parts of tin, five of lead, and eight of bismuth is known as *fusible metal.* The medical properties of bismuth are tonical and antispasmodic.

BISON (bĭ'sŏn), the name of a kind of wild cattle found in Europe and North America, and sometimes incorrectly called *buffalo.* The European bison, or *aurochs,* is now nearly extinct, being confined to parks and in a wild state to the forests of the Caucasus, and the total number now living is thought not to exceed 800. The American bison existed in large numbers in almost the whole of North America, but was most numerous in the Mississippi valley and the great plains of Central Canada. Herds of tens of thousands roamed across the plains, usually traveling in solid columns, traces of their tracks still remaining in the sod on the western prairies. They grazed upon the plains and traveled to watering places and alkaline licks, which is evidenced by the old trails which stretch for miles over hills and through valleys. They were one of the main sources of food supply for the Indians, and served a valuable purpose when the transcontinental railroads were in process of construction, since they were a prolific source of wholesome food for the workmen. The animal attains a height of about six feet, has short horns, a large hump back of the head formed of muscles, and shaggy hair of a dusky-brown color. It lives on grass, the bark of trees, and brushwood. Full development is reached at six years, and it attains to an age of thirty-five years. Only a few hundred still remain in the wild state, and these are protected by the government in parks of the Rocky Mountains. A small remnant of the so-called *wood buffalo* has survived in the forests of Great Slave Lake. However, a number of buffalo ranches for the purpose of rearing them have been established in various sections. The skins of these animals are very valuable, while the hump is prized for its rich and delicate flesh. The small herd in Yellowstone Park is slowly increasing. Buffaloes, when tamed, are peaceful and docile, but their number and strength made them a terror to all other animals in the early history of America.



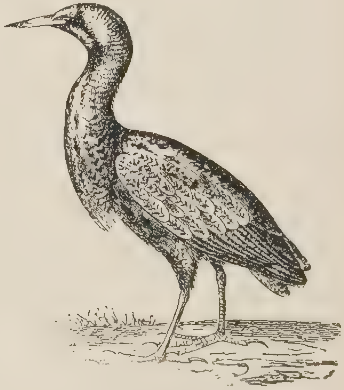
AMERICAN BISON.

BISSAGOS (bĭs-sä'gōz), or **Bijuga Islands,** a group of small islands near the west coast of Africa, opposite the mouth of the Rio Grande. They are of volcanic origin and inhabited by Negroes. Orange and Bulama are the chief islands, and Bulama, situated on the latter, is the leading town. Maize and fruit are cultivated, and goats and cattle are reared. These islands were discovered by the Portuguese, who made a settlement on Bissao, one of the group. They are governed as a dependency of Portuguese Guinea. Population, 3,750.

BISSELL (bĭs'sel), **Wilson Shannon,** statesman, born in Rome, N. Y., Dec. 31, 1847; died in 1903. He graduated at Yale in 1869 and took up the study of law in Buffalo, where he practiced with Grover Cleveland. He was attorney in many cases involving railroad litigation, and was an official in a line of the Lehigh Valley system. In 1893 he became Postmaster General of the Cabinet of President Cleveland, resigned in 1895 to resume the practice of law, and in 1902 was made chancellor of the University of Buffalo.

BITHYNIA (bĭ-thĭn'ĭ-ȧ), an ancient country of Asia Minor, separated from Europe by the Sea of Marmora and the Strait of Constantinople, then known respectively as the Propontis and Thracian Bosporus. It extended east to Paphlagonia, and contained the cities of Prusa Heraclea, Chalcedon, Nicomedia, and Nicaea. The Persians annexed it in 543 B. C., but it became an independent kingdom in 278 B. C. under Nicomedes I. Prusias II. was King of Bithynia at the time of the Punic Wars, when Hannibal sought refuge at his court. The Romans made it a province in 74 B. C., and it was governed under Pliny the Younger. In 1298 it was conquered by the Turks, and the seat of the Turkish government was at Prusa for many years.

BITTERN (bĭt'tẽrn), the name of several wading birds of the heron family, common to America, Africa, and Eurasia. They attain a length of 30 inches, and the wings, when extended, measure about 45 inches. Their color is yellowish-brown with bars and spots of black. They frequent low, marshy districts, remaining at rest during the day and coming out at twilight to seek insects, reptiles, fish, and small quadrupeds for food. They



BITTERN.

are remarkable for their ability to stand on one leg, or hold their head in the same position for several hours. The male produces a curious bellowing cry, which booms like a drum and may be heard fully a mile.

BITTERNUT. See **Hickory.**

BITTERROOT (bĭt'tẽr-ro͞ot), an American plant found extensively in the Rocky Mountains, both in Canada and the United States. It has an edible root, sometimes called *tobacco root,* and in cooking gives off an odor much like that of tobacco. The root is long and fleshy and from it grow a fleshy stalk and numerous leaves. The flower is solitary, beautifully colored, and remains open only during sunshine. The Bitterroot Mountains and the Bitterroot River were named from this plant, and the flower was adopted by Montana as the State flower.

BITTERWOOD, the name of several trees and shrubs native to Brazil and the West Indies, so named from the bitterness of their wood. The fruit is aromatic and the wood is used in making furniture, being valuable because insects do not attack it. The name is applied to a tree native to Jamaica, nearly allied to the quassia, the wood of which is used in medicine. See **Quassia.**

BITUMEN (bĭ-tū'mĕn), a mineral pitch of vegetable origin remarkable for its odor and inflammability. It is secured both in a fluid and solid state, and consists of about eighty-five parts carbon and fifteen parts hydrogen. The term is sometimes extended to include the hydrocarbons, as petroleum, naphtha, asphalt, and mineral tars. It is found more or less commonly in many parts of the earth, but the largest deposits of what may be classed as mineral pitch are in the vicinity of the Dead Sea. It is useful for building purposes to make floors, roofs, and arches water-tight, and in the construction of walks and pavements. The brick used in the walls of ancient Babylon were cemented with bitumen to increase their durability and solidity. See **Asphalt.**

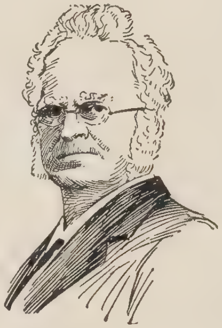
BITUMINOUS COAL (bĭ-tū'mĭ-nŭs). See **Coal.**

BITUMINOUS SHALE (shāl), a kind of clay found in the coal measures, so named from the carbon and volatile matter mixed with the clay. Large beds are quite common, and in some places the bituminous shales are used as fuel.

BIVALVES (bī'vălvz), the general name of mollusks having their shells in opposite portions, which open by elastic hinges and are closed by muscles. Among the bivalves are the cockle, clam, mussel, and oyster. With few exceptions, they are marine animals, while a number of univalves, single-shelled mollusks, are common to the land. The fossil remains of bivalves indicate the depth and extent of the ocean in early geological ages, and give evidence of their existence in the former part of the age of invertebrates, the Silurian age.

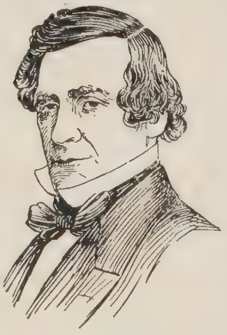
BIZET (bê-zâ'), **Alexandre César Léopold,** composer, born in Paris, France, Oct. 25, 1838; died June 3, 1875. He entered the Conservatoire at Paris when nine years of age, and afterward studied under Zimmermann and Benoist. Subsequently he studied in Italy, where he composed the opera "Don Procopio." His compositions belong to the romantic school, and his opera entitled "Carmen" is his best known production. "Vasco da Gama" and "La Jolie Fille de Perth" are popular operas.

BJÖRNSON (byẽrn'sŭn), **Björnstjerne,** poet, novelist, and dramatist, born in Kvikne Norway, Dec. 8, 1832; died April 25, 1910. He studied at Christiania and later at Copenhagen. His first publication was "Synnöve Solbakken," which appeared in 1857 and attracted much attention. He became manager of the Bergen Theater, for which place he was selected by the proprietor, Ole Bull, and in 1858 published "Arne" and "Halte-Hulda." In 1859 he became editor of the *Aftenbladet* in Christiania, and the next year went to Rome to pursue literary work, for which purpose the Parliament voted him a pension. Subsequently he took part in politics, visited the United States to study the republican institutions, and lectured to his Scandinavian countrymen in many American cities. He lived for many years in Rome and Tyrol, but spent his summers on his farm in Norway. Many of his writings have been translated into German and other languages. The most noteworthy of his recently published works include "A Cantata of Peace," "Paa Guds Veje," and a number of productions treating of political and social reform.



BJÖRNSTJERNE BJÖRNSON.

BLACK (blăk), **Jeremiah Sullivan,** statesman, born in Glades, Pa., Jan. 10, 1810; died Aug. 19, 1883. He attended the public schools and took up the study of law and built up a successful practice in Somerset County. In 1842 he was elected district judge, and from 1851 until 1857 he was a justice of the Supreme Court in Pennsylvania. President Buchanan made him Attorney General, in which capacity he protected the government from unjust claimants of land grants in California. and



J. S. BLACK.

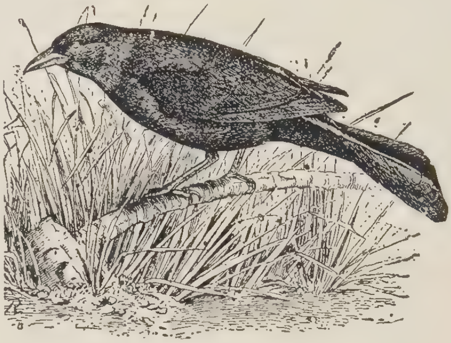
held the opinion that the Constitution gives the government the right to prevent insurrections and the secession of a State. In 1860 he succeeded General Cass as Secretary of State, and the following year retired from public office to practice law at York, Pa. He was one of the attorneys for President Johnson in the impeachment trial, an advocate of Tilden's claims before the electoral commission of 1876, and prominent in the lawsuits growing out of the Vanderbilt will contest.

BLACK, William, novelist, born in Glasgow, Scotland, in 1841; died Dec. 10, 1898. He was educated in his native city, became a newspaper reporter, and went to London, where he followed magazine writing. In the war of 1866 between Prussia and Austria he served as war correspondent to the *Chronicle,* and afterwards served on the editorial staff of the *Daily News* and London *Review.* In 1876 he traveled and began his career as novelist. The scenes of most of his writings are laid in the Scotch Highlands. His principal productions include "Love or Marriage," "A Daughter of Heth," "Princess of Thule," "Green Pasture and Piccadilly," "Judith Shakespeare," "Handsome Humes," and "Adventures of a House Boat."

BLACKADER, Alexander Dougall, physician and educator, prominent as a factor in the educational work of Canada. He studied at McGill University, Montreal, and later in London and Vienna, and in 1871 completed a course in medicine by graduation. He was surgeon on board of royal steamers to South American and Chinese ports, and began the practice of medicine at Montreal in 1877. Many Canadian and American medical and scientific associations honored him with the election to official positions and as members of important committees, including the Montreal Medico-Chirurgical Society and the American Association of Physicians. In 1883 he was made lecturer on diseases of children in McGill University and in 1891 became professor of pharmacology and therapeutics at the same institution, where he rendered valuable and efficient services. He published "Reference Handbook of the Medical Sciences" and contributed to numerous periodicals and works of reference.

BLACKBERRY (blăk'ber-rȳ), the name of a large bushy plant resembling the dewberry and raspberry, also called *brambleberry.* The bushes are armed with prickles, and the fruit is sweet and luscious. It is valuable for making jam, jelly, and preserves, and is eaten as a dessert. Blackberry wine is manufactured extensively, while astringent tonics derived from the berries are used largely in medicine. The fruit grows in the wild state, but it is greatly improved by cultivation. These plants are widely distributed in both hemispheres and thrive as far north as Central Canada. They are propagated from suckers and root cuttings. New varieties are secured by planting the seed.

BLACKBIRD, the name applied to a large family of birds of America and Europe, generally called *merle* in Western Europe. The *crow blackbird* and the *rustycrow blackbird* are of the starling family and nest largely in trees. *Red-winged blackbirds* constitute a widely distributed species, ranging throughout Southern Canada and in the United States from Maine to the Pacific. They live in meadows, marshes and swamps, where they nest and rear their young. In autumn they gather in flocks and delight to frequent meadows and stubble fields in large swarms. The food of blackbirds comprises worms, berries, and insects. Blackbirds are a protection to orchards in that they devour insects, but they also consume several kinds of fruit, such as cherries and grapes. A number of species are eaten by the Indians.


CROW BLACKBIRD.

BLACKBURN (blăk'bûrn), a manufacturing city of Lancaster County, England, about twenty-one miles northwest from Manchester. It is on the Leeds and Liverpool Canal and has extensive railway facilities. The chief buildings include the town hall, the Saint Mary's Church, the Draper's Hall, the county courthouse, and the municipal offices. Corporation Park and Queen's Park are fine public grounds. The importance of Blackburn as a commercial city dates back to the 17th century, when it began to manufacture large quantities of cotton goods. It is the seat of many cotton mills, and has large facilities for manufacturing steam engines, hardware, clothing, and cotton machinery. The cotton factories employ about 15,000 men and 20,000 women, and the annual output of the cotton industry is valued at $30,000,000. Blackburn maintains public baths, a public library, an art gallery, and many fine schools, including one founded by Queen Elizabeth. It has gas and electric lighting, street railways, pavements, waterworks, and two hospitals. Population, 1907 131,890; in 1921, 133,064.

BLACKBURN, Joseph Clay Styles, statesman, born in Woodford County, Kentucky, Oct. 1, 1838. He studied at Danville Center College and in Chicago, and was admitted to the bar in 1859. After practicing a short time in Chicago, he entered the Confederate army, and served until the close of the Civil War. In 1871 he was elected a member of the State Legislature in Kentucky and served as Congressman in 1875-85, and in the latter year became a member of the United States Senate. He was reëlected in 1891 and 1901, and was prominent on a number of important committees. He died Sept. 12, 1918.

BLACKFEET, a tribe of Indians distributed more or less through the Rocky Mountains of Montana, Wyoming, and British America, and classed with the Algonquins. In early history they constituted a powerful tribe, but were quite peaceful. In 1865 they became involved in trouble with western miners, and for five years a number of skirmishes took place in which considerable life was lost. At present they number about 5,000, of which about one-half are in the United States.

BLACKFISH or **Tautog,** the name of a large fish common along the Atlantic coast, much valued as a food product. It is allied to the dolphin and somewhat resembles the perch. The skin can be slipped off like that of an eel. It is one of the leading food fishes of the Eastern market, being pleasant and nutritious for table use.

BLACK FOREST, or **Schwarzwald,** a chain of mountains in Europe, located in Baden and Württemberg, where it stretches almost parallel with the Rhine for ninety miles. It is the source of the Kingiz, Neckar, and Danube rivers. The highest summit is Feldberg, which attains a height of 4,900 feet. The mineral products include iron, lead, cobalt, copper, and silver. Numerous mineral springs abound. There is a fine growth of timber, consisting mostly of pines on the foothills. In the valleys farming is extensively carried on, while in the towns manufacturing abounds. The manufactured articles consist of furniture, toys, wooden articles, and clocks. About 50,000 persons are engaged in the manufactories in the regions, and there is a considerable trade in merchandise and cereals. Railroads have been constructed along the mountain sides and through the valleys, and large centers of industry are building up rapidly.

BLACK FRIDAY, a term used to designate any Friday on which some great calamity occurred. In England it refers to Dec. 6, 1745, when Charles Edward, the pretender, reached Derby, and to May 11, 1866, when a general commercial panic reached its most oppressive phase. In the United States the name applies generally to Sept. 24, 1869, when a financial panic was caused by speculation in gold in the city of New York, and to Sept. 18, 1873, when a similar panic commenced.

BLACK GUM, or **Sour Gum,** a species of forest trees of North America, known in some localities as *tupelo* and *pepperidge.* The branches are crooked and bear tufts of leaves at the ends, and the wood is tough but not durable. Hubs of wheels are made of the timber. The tree has been introduced in Europe for ornamentation.

BLACK HAWK, a celebrated chief of the Sac and Fox Indians, born in Kaskaskia, Ill., in 1767; died in camp on the Des Moines River, in Iowa, Oct. 3, 1838. At an early age he became a successful chief against the Cherokee and Osage tribes, and was promoted to grand chieftain of the Sacs in 1788. In 1804 the Sacs and Foxes agreed to cede to the United States lands extending along the Mississippi River for an annuity of $2,000, the treaty being signed while he was absent, and he accordingly repudiated it. In the War of 1812 he joined the British army with 500 warriors, but soon retired from the British service and was induced to sign the treaty previously repudiated. When the Sacs and Foxes, under Chief Keokuk, removed beyond the Mississippi in 1823, Blackhawk, with a part of the tribe, refused to emigrate. Accordingly, he attacked the white settlers and was defeated by General Gaines at the head of a force of militia in 1831, and the next year was taken prisoner and confined in Fortress Monroe. Keokuk was elected by the Sacs and Foxes as grand chief to succeed Blackhawk, who was deposed after being taken to prison, from which he was released in 1833. Blackhawk was one of the most famous Indian chiefs of America. His history was published in 1834 by J. B. Patterson.

BLACKHEATH (blăk'hēth), a village and commons of seventy acres in Kent County, England, about seven miles from London. It is a favorite resort for pleasure parties, and is famous in history on account of insurrectionary gatherings. Among these are the gatherings of Wat Tyler, Jack Cade, and the Cornishmen. In 1011 it served as the camping ground of the Danes. Henry V. was welcomed on the Blackheath by the people of London, and the army of the Restoration was met in the vicinity by Charles II. while on his way from Dover. It is also famous as the scene of exploits of various highwaymen.

BLACK HILLS, a mountain group in the southwestern part of South Dakota and the northeastern part of Wyoming, which is crossed by the boundary line between these two states. It is about 100 miles long and 60 miles wide. Harney Peak, in South Dakota, rises 7,216 feet above the sea level and is the highest elevation. The region of the Black Hills was one of the best hunting grounds for the Indians, and was purchased of them in 1876. Agriculture is carried on in some districts under a system of irrigation, but in others the rainfall is sufficient to mature crops without artificial watering. Large portions of the Black Hills are covered with an abundance of timber, consisting largely of pine forests. The district is exceeding rich in thermal and mineral springs, which have been improved and now form favorite pleasure and health resorts. Mining is the chief industry and is carried on very extensively, producing lead, tin, gold, silver, copper, iron, limestone, and other minerals. The annual production aggregates many millions of dollars. Gold is the most important product, aggregating about $3,800,000 annually. The district contains a number of growing cities, among them Deadwood, Hot Springs, Lead City, and Rapid City.

BLACK HOLE, or Black Hole of Calcutta, a prison dungeon in the old fort of Calcutta, India, about twenty feet square, in which 146 men were confined by Surajah Dowlah on June 20, 1756, of whom all but 23 suffocated. A monument fifty feet high has been erected to commemorate their memory.

BLACKIE (blăk'ĭ), **John Stuart,** educator and author, born in Glasgow, Scotland, in 1809; died March 2, 1885. He studied at the universities of Aberdeen and Edinburgh, and subsequently at Berlin and Rome. In 1834 he was admitted to the bar, but soon gave up the practice of that profession for a literary career. He translated Goethe's "Faust" and contributed to numerous periodicals, and in 1852 became professor of Greek in the University of Edinburgh. During his work at this institution he effected many reforms and was instrumental in securing an endowment for a department of Celtic instruction. His chief works include "The Iliad of Homer," "Life of Burns," "Self-Culture," "Four Phases of Morals," "Songs of the Highlands and Islands," and a translation of "War Songs of the Germans."

BLACKING, a preparation used to blacken leather. Numerous recipes for making blacking are in use, most of which are made of bone black with a small quantity of sugar, oil, and sulphuric acid. In some recipes the bone black has been displaced by lamp black or ivory black. Blacking intended for boots and shoes is usually put up in boxes as a paste, in which form it is applied with a brush, but some kinds are in the liquid form.

BLACKLIST, a list kept by business men on which the names of defaulters and delinquents are recorded, and by industrial societies to designate persons as untrustworthy. Such lists are prepared to warn others. Blacklisting has been included among the statutory crimes in some countries.

BLACKMAIL, a certain tribute levied, in early history, in the north of England and Scotland by robbers in consideration of which they promised protection from their attacks. The term is now used to designate the efforts made to secure hush money, or extort a valuable consideration by threats of public accusation, censure, or exposure.

BLACKMORE (blăk'mōr), **Richard Doddridge,** novelist, born at Longworth, England, in 1825; died Jan. 20, 1900. His education was obtained at Tiverton and in Exeter College, Oxford. He was admitted to the bar in 1852 and began the practice of law as conveyancer, but devoted much research to literature. His "Lorna Doone" is one of the most popular English romances and has gone through many editions. Among his other noteworthy works are the translation of Virgil's "Georgics," and the novels "Maid of Sker," "Tommy Upmore," "Alice Lorraine," "Mary Anerley," and "Tale of the South Downs."

BLACK MOUNTAINS, a group of mountains in North Carolina, belonging to the Appalachian system. Mitchell's Peak, its highest summit, is the loftiest mountain east of the Mississippi River; height, 6,710 feet. It was named in honor of Dr. E. Mitchell, of the University of North Carolina, who died here while making an exploring tour. Other high peaks include Clingman's Peak, 6,700 feet, and Guyot's Peak, 6,660 feet.

BLACK PRINCE. See **Edward III.**

BLACK SEA, a large inland sea located south and west of Russia, north of Asia Minor, and east of the Balkan states. It has a superficial area of 173,000 square miles; its greatest depth is 6,420 feet, and its mean depth about 2,472 feet. The surface, including the Sea of Azof, is about 175,000 square miles, or more than five times larger than Lake Superior. It receives the water of the Dnieper, Dniester, and Danube from Europe, and of the Sakaria and Kizil Irmak from Asia, while the outflow of the Don reaches it through the Sea of Azof. Its waters are less salty than those of the Mediterranean and not so clear, owing to the large inflow from these rivers. It is the site of an important commerce, largely because of its connection with the Mediterranean by the Sea of Marmora and the Bosphorus, and many navigable rivers and canals that are tributary to it. In the summer season the surface is at rest and secure for steamboat and ship navigation, but in winter fierce and dangerous storms sweep over it. However, this disadvantage is compensated for in part by its shores and interior being free from rocks and shallows. Oceanic currents are wanting, but the inflowing rivers cause a very similar effect upon its waters. The most important ports include Samsun, Batum, Trebizond, Sinope, Kherson, Odessa, Sebastopol, and Varna. It yields fish in large quantities. Subsequent to the Turkish conquest of Constantinople it remained under the exclusive control of the Turks until 1774, when joint control was ceded to Russia, and later the same rights were granted to Austria, Great Britain, and France. At present the waters are open to the commerce of all nations. In ancient times the Black Sea was known as *Pontus Euxinus.* On its eastern shore was Colchis, the goal of the Argonautic expedition.

BLACK SNAKE, or **Blue Racer,** a large snake widely distributed over North America, but most abundant east of the Mississippi River. The eyes are large, the head is oval and long, the nostrils lateral, and the body is slender. It attains a length of nine feet, is not poisonous, and lives on birds and small quadrupeds. It is especially fond of rats. The Australian black snake is closely allied to the cobra and is very poisonous.

BLACKSTONE (blăk'stôn), a town of Massachusetts, in Worcester County, on the Blackstone River, and on the New York, New Haven and Hartford Railroad. It is about two miles northwest of Woonsocket, R. I., and has electric railway conveniences. The manufactures embrace cotton and woolen goods, rubber shoes, and machinery. A public library and several schools and churches are among the chief buildings. It has a brisk trade in merchandise and fruit. The first settlement was made on its site about 1700 and it was so named from William Blackstone, who was the first settler at Boston. Population, 1920, 4,299.

BLACKSTONE, Sir William, distinguished jurist, born in London, England, July 10, 1723; died Feb. 14, 1780. He was the son of a silk merchant and was sent by his uncle to Oxford, where he received a liberal education. He became a successful lawyer, and in 1753 delivered a course of lectures on English law at Oxford. In 1758 he was appointed a professor of law at that university, subsequently held the office of counsel to George III., and later was solicitor general to the queen. He published four volumes of his law lectures delivered at Oxford that constitute his celebrated "Commentaries on the Law of England." This work has gone through many editions and translations, and acquired a high reputation as a text among students of law.

BLACKWELL (blăk'wĕl), **Antoinette Louisa Brown,** advocate of woman's suffrage, born at Henrietta, N. Y., May 20, 1825. Her education was received at Oberlin, but she was refused a license to preach. In 1853 she began to preach by invitation, and later was ordained as a pastor of the Congregational Church at South Butler. Subsequently she became a Unitarian and gained eminence as an advocate of woman's suffrage. Among her numerous works are "The Shadows of Our Social System," "The Sexes Throughout Nature," "The Market Woman," and "The Physical Basis of Immortality." She died Nov. 5, 1921.

BLACKWELL, Elizabeth, doctor of medicine, born in Bristol, England, Feb. 3, 1821. She came to the United States when young, graduated from the college at Geneva, N. Y., in 1849, and was the first woman admitted to the practice of medicine in the United States. She founded the New York Infirmary for Women and Children, in 1853, and the Women's Medical College of the New York Infirmary, in 1868. She attained much success in the practice of medicine. In 1859 she made an extended visit to Europe, and while there delivered a series of lectures in the Woman's Medical School, London, which were highly complimented. She wrote several works of importance on medicine and social questions. Her "Law of Life" is well known. She died June 1, 1910.

BLACKWELL'S ISLAND, a narrow and rocky island of New York, so named from its former owner, located in the East River, and now a part of New York City. It has an area of 120 acres. On it are situated a number of public institutions of different kinds, including a penitentiary, a charity and fever hospital, and several work and alms houses. A lighthouse about sixty feet above the sea is located at its northern end.

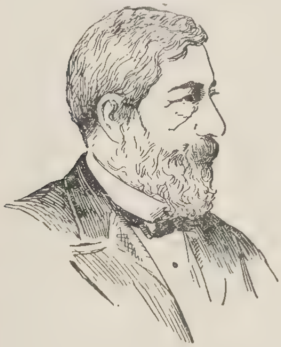
BLACKWOOD (blăk'wo͝od), **William,** publisher, born in Edinburgh, Scotland, Nov. 20, 1776; died Sept. 16, 1834. He became a bookseller at Glasgow in 1804, and subsequently founded bookstores in London and Edinburgh. In 1817 he began publishing *Blackwood's Magazine* and by hard work made it a success. Among the contributors to this publication were J. G. Lockhart, Scott, and De Quincy. Politically, the publication supported the policies of the Tories. The business management of the publishing house passed to his sons after his death. This establishment has been greatly enlarged.

BLADDER. See **Kidneys.**

BLADDER NUT (blăd'dẽr nŭt), the name of several plants native to North America and Eurasia. They are so called from the fruit, which is an inflated bladder, and within are a number of hard seeds. In some localities the bladder nut is planted as an ornamental tree, and the seeds are used in medicine as a mild aperient.

BLADDERWORT, a genus of aquatic plants found in the marshes and lakes of most countries. In the tropics they grow luxuriantly, and their flowers, like those of water lilies, adorn the surface of ponds and other shallow bodies of water. Australia is exceptionally rich in plants of this kind and they grow abundantly in Great Britain and the United States. Most of the Canadian varieties have yellow flowers, and those of the United States have blossoms of violet, yellow, or purple. Little bladders or vesicles on the leaves and stems become filled with air about flowering time, causing those parts to be held above the surface, where the flowers expand, and afterward the air escapes and the plant sinks to the bottom, where the seeds ripen. In some species the bladders hold moisture after the air escapes, and the plant is kept fresh and alive even if the water in the pool or marsh sinks away.

BLADENSBURG, a village of Maryland, in Prince George County, six miles northeast of Washington, D. C. It is on a branch of the Potomac River, and is noted for a battle fought here Aug. 24, 1814, between the British under General Ross and a force of American militia under General Winder, in which the British were successful and shortly after captured Washington. Population 1920, 460.


JAMES GILLESPIE BLAINE.

BLAINE (blān), **James Gillespie,** statesman, born at West Brownsville, Penn., Jan. 31, 1830; died in Washington, D. C., Jan. 27, 1893. He was of Scotch-Irish parentage, showed mental skill in his studies at an early age, and graduated from Washington College when only seventeen years old. He became a teacher at the military institution at Blue Lick Springs, Ky., studied law, and later was a teacher in the Institution for the Blind at Philadelphia. In 1854 he removed to Augusta, Me., and published the Kennebec *Journal* and later the Portland *Advertiser.* In 1858 he was elected to the State Legislature and four years later to the national House of Representatives, in which he served consecutively until 1876, when he became a member of the United States Senate. His efficient and prominent career in Congress brought him forward as a Republican candidate for President in 1876, when he lacked only 28 votes of securing the nomination. His name was presented to the convention in a masterly address by Robert G. Ingersoll, who termed him *The Plumed Knight,* by which name he was commonly known.

Blaine was a candidate for President a second time in the Republican convention of 1880, when he received 284 votes, but the nomination was given to James A. Garfield. He became Secretary of State under President Garfield and remained in the Cabinet until the death of the latter, when he retired from active service to write the first volume of his famous historical work, "Twenty Years of Congress." In 1884 he was nominated as the Republican candidate for President, but was defeated by Grover Cleveland. He failed of election largely on account of support in the State of New York, which he lost by 1,047 votes, out of a total of 1,200,000. Subsequently he spent four years in foreign travel and in writing the second volume of his book. In 1888 he declined to be a candidate for President, and after the election of President Harrison was chosen Secretary of State, which position he filled with eminent ability. In 1892 he again became a candidate for President, but was defeated for the nomination in the convention held at Minneapolis.

The life of Blaine stands before the American people as one of the most eminent in statesmanship and devotion to public duty. He was a warm friend of education, father of the Fourteenth amendment to the Constitution, and an opponent to the doctrine of perpetual alliance with Great Britain. He advocated and afterward presided over the Pan-American Congress, and was the most eminent advocate of the doctrine of reciprocity in trade with foreign nations, especially as it affected Germany, Spain, and the republics of South America.

BLAIR (blâr), **Francis Preston,** statesman and soldier, born at Lexington, Ky., Feb. 19, 1821; died July 8, 1875. He was a son of Francis Preston Blair (1791-1876), graduated at Princeton, and began the practice of law in Saint Louis in 1843. He served as a private in the Mexican War, and subsequently edited the *Missouri Democrat.* In 1852-56 he was a member of the Legislature in Missouri, and in the latter year supported the Republican party and was elected to Congress. He was reëlected in 1860 and 1862, but joined the Federal army and did much to keep Kentucky and Missouri in possession of the Federals. In 1862 he was raised to the rank of major general. At Lookout Mountain and Missionary Ridge he rendered valuable service, and subsequently accompanied Sherman on his march to the sea. Being dissatisfied with the policy of reconstruction, he joined the Democrat party and was nominated for Vice President in 1868 on the ticket with Horatio Seymour. In 1871 he was elected as a Democrat to the United States Senate to fill a vacancy, and retired from public service in 1873.

BLAIR, Francis Preston, statesman, born in Abingdon, Va., April 12, 1791; died Oct. 18, 1876. He became interested in politics at an early age and supported Henry Clay as a Whig candidate for president. In 1829 he founded *The Globe,* a newspaper important as a Democratic organ, of which he remained publisher until 1845. In 1856 he promoted the organization of the Republican party, presided over the convention which nominated Fremont, and advocated the election of Lincoln. He was influential in promoting the peace conference at Hampton Roads in 1865, and subsequently opposed the reconstruction measures of the Republican party.

BLAIR, Henry William, lawyer and statesman, born in Campton, N. H., Dec. 6, 1834; died March 14, 1920. He studied law, entered the Federal army, and served during the Civil War and was twice wounded. In 1866-68 he was a member of the Legislature, served in Congress in 1875-79 and in 1893-95, and was a member of the United States Senate in 1879-91. He was prominent in committee work and delivered noted speeches upon finance, tariff, and educational questions, and advocated woman suffrage and prohibition. After retiring from public service, he took up the practice of law. He published "The Temperance Movement."

BLAIR, James, educator, born in Scotland in 1656; died in Williamsburg, Va., Aug. 1, 1743. He graduated at the University of Edinburgh in 1673, became a clergyman of the Episcopal church, and in 1685 removed to Virginia and engaged in missionary work. In 1690 he took up the project of founding a college, and, after having gathered funds, secured a charter to establish the William and Mary College, of which he was the first president. For some time he was a member of the council of Virginia. He published a commentary entitled "Sermon on the Mount."

BLAIR, John Insley, capitalist, born in Warren County, N. J., Aug. 22, 1802; died Dec. 2, 1899. He worked in a small store as a clerk while a boy and later removed to Blairstown and became interested in an iron foundry. It was due to his effort to use anthracite coal in manufacturing iron that the coal fields of Pennsylvania became generally known, and he constructed a railroad to transport the product from the mines to his works. This line was afterward organized as the Delaware, Lackawanna and Western. Subsequently he built many lines of railroads in Iowa and Nebraska, and for some time was a director of the Union Pacific. He made generous gifts to Princeton College, to Grinnell College, Iowa, and to the Presbyterian Academy at Blairstown, N. J.

BLAIR, Montgomery, lawyer and statesman, born in Franklin County, Ky., May 10, 1813; died at Silver Springs, Md., July 26, 1883. He was the son of Francis Preston Blair (1791-1876), an American statesman of Virginia. He received a military education at West Point, served in the Seminole War, and became Postmaster General under Lincoln. In the famous Dred Scott case of 1857, he was counsel for the slave, and is noted for his ability as a constitutional lawyer. After 1867 he acted with the Democrat party, and ten years later wrote several articles in which he attacked the title of President Hayes to the Presidency.

BLAKE (blāk), **Edward,** statesman, born in Adelaide, Ont., Oct. 13, 1833; died Mar. 1, 1912. He attended University College, where he graduated in 1857, and was admitted to the bar. In 1867 he was elected to the Canadian Parliament as a Liberal and was Prime Minister in 1871-72. He was Attorney General of Canada in 1875-77 and president of the council in 1877-87, and in 1880 succeeded Mr. Mackenzie as leader of the Liberals. Being in sympathy with the move for home rule in Ireland, he was elected to the British Parliament in 1892 from South Longford, Ireland, and in 1896 became a member of the privy council.

BLAKE, Robert, celebrated admiral, born at Bridgewater, England, in 1599; died Aug. 17, 1657. He enlisted in the cause of Cromwell, in which he distinguished himself by defending Taunton against the royalists, and in 1649 built up a fleet with which he destroyed the squadron commanded by Prince Rupert. In 1652 he began a combat against the Dutch under Admiral Van Tromp, and by numerous successes established English naval supremacy. In 1654 he commanded successfully on the Mediterranean, where he gained victories over the fleets of Algeria and Tripoli, and in 1657 defeated the Spanish off the Island of Teneriffe. To the achievements of Blake were due English efficiency as a naval power, which began to take effect in the latter part of the 17th century. His defeat of the Spanish was the last of his successes, as he died before returning to Plymouth.

BLAKE, William, engraver and poet, born in London, England, Nov. 28, 1757; died Aug. 27, 1827. At an early age he showed much interest in drawing and verse-making, and in 1789 published his greatest work, "Songs of Innocence." This was followed in 1794 by "Songs of Experience," which he illustrated with about sixty remarkable, original etchings. Later he published others, among them "Illustrations of the Book of Job." He died in utter poverty and obscurity, thinking himself a martyr to the poetic art. He is now regarded one of the most extraordinary men of his time.

BLANC (blän), **Jean Joseph Louis,** historian and socialist, born at Madrid, Spain, Oct. 29, 1811; died at Cannes, France, Dec. 6, 1882. After completing a common school education, he studied in Paris, became private tutor at Arras, and in 1834 returned to Paris, where he began writing contributions for periodicals devoted to socialism. In 1839 he founded the *Review of Progress,* in which he published "Organization of Labor," and afterward issued it in separate form. His work, "History of Ten Years," contains many passages that are unfavorable to the political prospects of the Orleans dynasty, and on account of this he was compelled to seek safety by escaping to London. While in exile he completed his famous "History of the French Revolution," and made other contributions to political and historical literature. On the fall of the empire he returned to France, where he was chosen a member of the national assembly in 1871. Five years later he was elected member of the chamber of deputies. His influence in socialism stands preëminent as a powerful factor in French history.

BLANC, Marie Therese, gentlewoman of letters, born at Seine-Port, France, Sept. 21, 1840; died in 1907. She became known by publishing romances and works devoted to reforms. In 1893 she visited the Columbian Exposition at Chicago. She is the author of a large number of novels and works on social reforms. Her best known writings include "Romance of a Mute," "Tony," "A Remorse," and "The Literature and Customs of Foreigners."

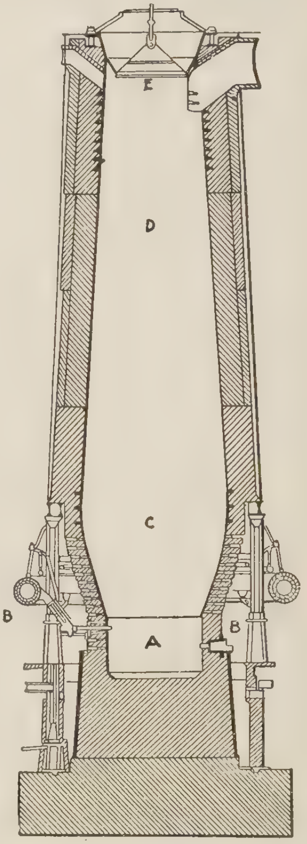
BLANC, Mont. See **Mont Blanc.**

BLAND (blănd), **Richard Parks,** statesman, born in Ohio County, Kentucky, Aug. 19, 1835; died at Lebanon, Mo., June 15, 1899. After securing a common school education, he attended Hartford Academy, and engaged in school teaching in Kentucky, Missouri, and Colorado. He was admitted to the bar in 1860 and practiced law at Rolla, but in 1866 moved to Lebanon on a farm of 400 acres. In 1872 he was elected to Congress as a Democrat and served continuously up to the time of his death, except for the two years beginning in 1894, making his service in Congress about 25 years. He was an advocate of the use of both gold and silver as standard money and an opponent of national banks from an early period in his congressional career. In 1872 he advocated an increase of the greenback circulation and supported the silver act of 1877, which required the coinage of not less than two million and not more than four million dollars of silver bullion each month into the standard silver dollar. This was vetoed by Hayes, but passed over the President's veto. He was a persistent opponent of the rechartering of national banks, and an active advocate of the Mills' Tariff Bill. At the national Democratic convention of 1896 he was placed in nomination for the Presidency and received 291 votes. He was largely instrumental in formulating the policy of the Democratic party in favor of bimetallism and in opposition to trusts and the Philippine policy of the Republicans. Owing to his devotion to these principles he was commonly called *Silver Bland* and *Cedar of Lebanon.*

BLANK VERSE, a term generally applied to poetry without rhyme, and first adopted in English literature from the Italian by the Earl of Surrey. The classical productions of the Greek and Roman poets are composed in blank verse. It has never been popular in Spanish and French, but in English and German it has been largely followed. Bryant's "Thanatopsis" and Longfellow's "Hiawatha" are good examples of productions written in blank verse.

BLARNEY (blär'nĭ), a stone built in the wall of an old castle in the village of Blarney, Ireland, four miles northwest of Cork. There is a tradition that the kissing of this stone will confer the ability to use the peculiar flattering, persuasive speech known as *blarneying.* In Oliver Goldsmith's "The Vicar of Wakefield," the *Lady of Blarney* is represented as a bad character.

BLAST FURNACE (blȧst fûr'nȧs), a furnace designed for smelting iron ore and extracting from it the iron by means of a powerful blast of air. The Egyptians are represented in their early sculpture with a blowpipe to increase the current of burning fuel in furnaces, while the Indians and Oriental classes still use bellows for that purpose. Both the Germans and Gauls employed the hot blast in manufacturing lances and spears, while the Romans, during their invasion of the British Isles, employed iron, secured by smelting in blast furnaces, which is evidenced by cinders still remaining as a result of their work. However, their process was so crude that iron was illy extracted from the ore. Large heaps of the refuse matter found in the Forest of Dean furnished a good supply of ore for nearly 300 years, which clearly demonstrates that their process was inefficient. The furnaces used by the Romans were built largely on the top of hills, for the purpose of obtaining the best possible currents of air for heating the ore and extracting the iron.



BLAST FURNACE.

a, hearth; *b b*, tuyeres; *c*, boshes; stack; *e*, hopper for charging the furnace.

Blast furnaces are used at present principally for smelting iron ores. They are constructed of solid masonry, sometimes to a height of over 100 feet. This construction enables utilizing an upper current of air by assisting natural draft with artificial appliances, thus largely increasing the amount of oxygen necessary to a mineral under treatment. As seen in the illustration, the air-blast, which is propelled by a blowing engine, is injected into the furnace through the hearth by means of pipes called *tuyères.* Immediately above the hearth are the *boshes,* forming a conical wall, the upper part of which forms the *stack.* The *charges* are fed into the furnace from above so as to keep the receptacle completely filled as the layers within melt and are removed.

The process of smelting consists of pouring into the top, or at the mouth, of a heated furnace a proportional quantity of fuel, limestone, and ore. When the hot air is blown through a blast pipe it strikes the charges deposited in the furnace. As a result of the intense heat coming in contact with the charge gas is formed, which escapes upward, through the mouth, and the metallic iron, thus set free, drops into a lower and hotter part of the furnace, where it melts. On the application of heat the lime and earthy matter of the ore become united, thus forming cinder or fluid slag that floats on the top of the melted iron. When a sufficient quantity of molten matter has accumulated, the slag is thrown away and the iron cast into molds. Iron thus cast is called *pig iron.* The furnace is modified according to the amount of heat required for the purpose of melting the kind of metal smelted from ore, and the heat generated is governed accordingly. In the blast furnaces of newer construction the gas formed is conducted by pipes to be utilized in making steam or as fuel in heating the blast.

In recent years material improvements have been made in smelting. By means of these the daily output of blast furnaces has been vastly increased and the cost of iron and steel has been correspondingly lightened. These improvements, besides increasing the output, have made it possible to apply a greater intensity of heat, thus extracting a larger per cent. of valuable metals from the ores and bringing the products to a higher degree of utility. In the production of Bessemer pig, by the common furnaces, it has become possible to produce 540 tons in a day. The furnaces, as well as bosh walls, have been made more durable by the use of carbon to protect the parts coming in contact with the intense heat required in blasting, and also by the use of water cooling. Improvements in methods of constructing lining for blast furnaces have enabled manufacturers to produce 400,000 tons of pig by a single lining. Besides, with the use of natural gas and electrical appliances, material saving has resulted, although coke, anthracite, and charcoal furnaces are still generally used. Owing to recent and numerous improvements in machinery, it is likely that these materials will always continue to serve for smelting purposes to the best advantage, with possible exceptions in districts favorably located to natural gas and petroleum deposits.

BLASTING the process of disintegrating portions of rock, or other solid substances, by means of an air explosive agent, such as powder or dynamite. It is resorted to in mining, tunneling, and quarrying. The usual plan is to bore holes in the rock to be blasted, placing into them the explosive and tamping the hole with clay, sand, or broken stone, and then firing the charge by a time fuse or an electric spark. The discovery of new explosives and the invention of machinery useful in boring and firing have enabled rapid advancement in the art. Dynamite and gun cotton are used where rapid destruction is desired, but where a moderate cleaving or splitting effect is needed, as in blasting for building purposes, powder is superior. Rock-boring machines have been largely substituted for hand labor. By means of these compressed air is utilized to bore holes, in which the blasts are fired. The greatest enterprise in blasting ever undertaken was the removal of the Flood Rock at Hell Gate, New York City. This ledge of rock covered nearly nine acres. To effect the blasting about 240,000 pounds of powder, dynamite, and other explosives were used. The rocks broken up weighed millions of tons.

BLAUVELT (blṳ′vĕlt), **Lillian Evans,** singer and actress, born in Brooklyn, N. Y., in 1873. She played successfully as a violinist when eight years old, and subsequently studied voice culture in Paris for three years. In 1888 she made her début in Brussels, taking the important rôles in "Faust" and "Romeo and Juliet." She was compelled to leave the stage as the result of hard study and exertion, but soon came back and took up concert and oratorio. In 1898 she toured the leading cities of Great Britain, and for several seasons sung successfully in Canada and the United States. She toured Germany, Switzerland, France, and other countries of Europe and was everywhere greeted with warm applause.

BLAVATSKY (blȧ-väts′kē), **Helena Petrovina,** theosophist, born in Ekaterinoslav, Russia, in 1831; died May 8, 1891. She traveled extensively in Europe and Asia, and devoted much time to a study of Buddhism and spiritualism. In 1870 she visited Egypt and subsequently traveled in England and America. She founded the Theosophical Society in New York City, and later published with Annie Besant a magazine called *Lucifer,* which appeared regularly in London until her death. For some time she was in wide repute as a worker in occult science and spiritism, but she lost prestige when it was shown that some of her pretentions were impostures. She wrote "The Voice of Silence," "Isis Unveiled," and "The Secret Doctrine."

BLEACHING (blēch′ĭng), the art of rendering materials perfectly white or nearly so. The ancient methods of bleaching consisted of exposing the fabrics to the action of the sun. The fabrics were laid out and frequently wetted, and, after remaining exposed to the actinic rays of the sun, they became greatly whitened. A class of fine fabrics are known as *lawns* from the methods of bleaching them by spreading the goods on plots of grass. Likewise, the best grade of linens are known as *hollands,* since the Dutch excelled in bleaching that class of fabrics. The present process consists of employing bleaching agents, as diluted sulphuric acid or chloride of lime. Some fabrics are bleached by alternately dipping them into a bleaching powder made of chloride of lime and sulphuric acid. The process is modified in accordance with the material bleached; calico, silk, wool, linen, and various other fabrics require a greater or less dilution of the chemicals and a varied number of dippings. Bleaching is practiced to a considerable extent in treating paper, ivory, oils, and wax, which are greatly enhanced in value by whitening.

BLENDE (blĕnd), or **Sphalerite,** the native sulphide of zinc, from which zinc is obtained. It occurs both massive and chrystallized, either in primary or secondary rocks, and is yellow or brownish in color. Deposits occur in many parts of the United States and Canada. It is especially abundant in Missouri, Illinois, and Wisconsin. At Cornwall, England, it is found with lead ores and is worked for the zinc and sulphur, the latter being used in making sulphuric acid. The best grade contains about thirty per cent. of sulphur and sixty-five of zinc.

BLENHEIM (blĕn'ĭm), a village in Bavaria, Germany, about 23 miles northwest of Augsburg, on the Danube River. It is noted for the great battle fought here on Aug. 13, 1704, in which the allied forces of England and Germany gained a complete victory over the Bavarians and French. Each of the contending armies consisted of about 53,000 soldiers. The former were commanded by Prince Eugene and the Duke of Marlborough and the latter by Prince Rupert and Marshal Tallard. The defeated army lost 12,000 in killed and 14,000 prisoners, while the remainder retreated in disorder. The present Duke of Marlborough, Count of Blenheim, married the daughter of W. K. Vanderbilt, of New York City. In 1800 the French defeated the Austrians near Blenheim. The village has a population of 825.

BLENNERHASSETT (blĕn-nĕr-hăs'sĕt), **Harman,** an accomplice of Aaron Burr, born in Hampshire, England, Oct. 8, 1764. He was educated at Westminster School, London, and Trinity College, Dublin, and in 1790 received the degrees of B. A. and LL. B. Becoming dissatisfied with his Irish estates, he sold them and came to America with about $100,000. In 1798 he bought Backus Island, an island in the Ohio River near Parkersburg, W. Va., containing about 170 acres. On this he built a beautiful mansion and adorned it with works of art, a library, and scientific appliances. His home was enjoyed by many visitors, among them Aaron Burr, who was bitter on account of political disappointments. He became interested in Burr's scheme to form an empire in the southwestern part of North America and contributed considerable money for arms, boats, and equipments with which to begin the enterprise. About this time President Jefferson issued a proclamation against the scheme, and. fearing arrest, Blennerhassett left the island and joined Burr at the mouth of the Cumberland River. Subsequently he was arrested, but was acquitted by the government. His fine mansion was used as a storehouse and afterward destroyed by fire. Later he bought 1,000 acres of cotton land in Mississippi and became a planter, but it proved an unsuccessful investment. In 1819 he removed to Montreal where he endeavored to acquire a legal practice, but failed. He sailed to Ireland in 1822, where he failed in earning a livelihood, and died Feb. 1, 1831, in complete obscurity on the island of Guernsey.

BLESSINGTON (blĕs'ĭng-tŭn), **Marguerite, Countess of,** author and society leader, born near Clonmel, Ireland, Sept. 1, 1789; died June 4, 1849. She was a daughter of Edmund Power and when 15 years of age married Captain Farmer, and shortly after his death became the wife of the Earl of Blessington. In 1818 she made an extended tour of Europe and subsequently lived in Gore House, London, where she gathered about her a number of prominent men and women. When Louis Napoleon became King of France, she removed to Paris and engaged in literary work. Her chief writings are "The Idler in France" and "Conversations with Lord Byron."

BLIND, the state of being deprived of the sense of sight. Blindness is most prevalent in the tropical regions, and least common in the temperate. It is more general in the Eastern Continent than in the Western. A very small number of children are born blind, although there are hereditary tendencies more or less prevalent. By far the greater number of cases result from accident, smallpox, or diseases of the eye, such as inflammation, cataract, or defect of the optic nerve. Old age is frequently accompanied by blindness, owing to a drying of the lachrymal canal and humor of the eye, or to an impairment of the crystalline lens or other vital organs. Frequently some slight deformity of the parts of the eye or its surrounding lead to a loss of sight. Blindness is generally attended by an increased vitality of the other senses, thus in part compensating for the loss of the visual faculty.

Asylums for the blind were established in Germany and France as early as 1260, the prime object being to relieve the Crusaders who had lost their sight in the East. Subsequently asylums of this character were established and are at present supported in all civilized countries. In the United States a large number of institutions are maintained, both for adult and minor blind, by the several states under a system of general taxation. Among a number of such schools in Canada may be mentioned the Ontario Institution for the Blind at Brantford. In these institutions the industrial arts are taught successfully, usually with a view to aid in making the students self-supporting. The courses of study generally include all the common and high school branches and industrial arts, such as knitting, sewing, weaving, rope making, broom making, and divers household duties.

Many systems of alphabets for the blind have been invented and are now in successful use. The print consists of characters raised above the surface of the paper and is read by means of passing the fingers over the characters, thus determining their signification by means of the sense of touch. The text-books used are made on this plan both for teaching and for general reading. Another method of teaching is by what is known as the *point system.* It consists of a number of dots instead of the letters of the alphabet, and has largely superseded all other systems for teaching both reading and writing. In writing the blind use a dotted or grooved appliance over which they lay paper and with a style dot on the surface. Raised characters then appear on the underside, the meaning of which can be determined by passing the fingers over the lines.

Books for the blind have been published on a very large scale, including works on the sciences, novels, romances, poetry, large portions of the Scriptures, and many other valuable literary productions. The system of writing used by the blind has been so perfected that by means of texts, and skill in determining the different characters, it is possible for those who have lost their sight to become quite as well trained as the more fortunate who have full use of the eye. Among the publications for the blind recently produced in large numbers are "Practical System of Tangible Music Notation" and "International Sunday School Lessons for the Blind." The Congressional Library at Washington, D. C., contains about 100,000 books and has a special reading room for the blind.

BLIND (blĭnt), **Karl,** agitator and writer, born in Mannheim, Germany, Sept. 4, 1826; died May 21, 1907. He studied at the universities of Heidelberg and Bonn, and in 1848 participated in a revolutionary movement in Baden. The following year he took part in an insurrection in southern Germany and was sentenced to imprisonment for eight years. He was made envoy to Paris shortly after his release, which was brought about by the people of Carlsruhe, but was expelled from France and finally settled in London. He is the author of many works relating to government and revolutionary movements. He supported the Polish rising in 1853 against Russia, the American Union cause against the Confederacy, the German cause in the French War of 1870-71, the Italian cause against the Papacy, and the Russian movement for freedom.

BLIND FISH, a class of fish common to the waters of caves. These fish have rudimentary eyes covered with skin, but are totally destitute of sight, and the body is covered with small sensitive projections, or papillae, which serve as organs of touch and partly compensate for the absence of vision. Like all other cave animals, they are colorless or pale. The body ranges in length from three to five inches and has fully developed fins, enabling the fish to move about with facility. They feed upon small insects and crustaceans common to caves. Many species are found in the Mammoth Cave of Kentucky (q. v.), in the cave of Cacahuamilpa, Mexico, and the caves of New Zealand.

BLISS, Cornelius Newton, merchant and statesman, born at Fall River, Mass., Jan. 26, 1833. He acquired a business education in a commercial house in Boston. In 1897 he entered McKinley's Cabinet as Secretary of the Interior, which position he resigned the following year. He died Oct. 9, 1911.

BLISS, Philip Paul, evangelist, born in Clearfield, Pa., July 9, 1838; died Dec. 29, 1876. In company with D. L. Moody he visited many sections of the United States and Canada and exerted a wide influence in religious gatherings. His songs include "Pull for the Shore," "Hold the Fort," "Hallelujah! 'Tis Done," and "Down Life's Dark Vale We Wander."

BLISS, Tasker Howard, army officer, born at Lewisburg, Pa., Dec. 31, 1853. He studied at Lewisburg and West Point; served in the army from 1875 until 1892, and in 1897 became an attaché of the United States legation to Spain. At the beginning of the Spanish-American War, in 1898, he was recalled and served as chief of staff to General Wilson in Porto Rico. In 1917-1918 he served on the inter-allied war council in France, with the rank of general, and subsequently was one of the five American peace comissioners.

BLISTER (blĭs'tẽr), a vesicle of the skin, either the result of an injury or of certain medical applications, and filled with a collection of serus fluid. The term is applied to various compounds and applications employed in medicine, such as the Spanish fly blister. They are used in the treatment of ulcers and tumors, and for the relief of muscular pain. Among the common blisters, besides Spanish fly, croton oil, mustard, ammonia, and others are used.

BLIZZARD (blĭz'zẽrd), a fierce storm attended with falling or driven snow and a low temperature. Blizzards are common in the north central part of North America, especially in the great central plain of Canada and the northern portion of the Mississippi valley, where the thermometer frequently falls as low as from 10° to 50° below zero in the colder part of winter. The movement of the wind is usually from the northwest and storms frequently extend as far south as the Ohio River.

BLOCK. See **Pulley.**

BLOCKADE (blŏk-ād'), the act of closing all trade with certain seaports or the coasts of an enemy. It was the ancient practice of belligerents at the beginning of hostilities to forbid by proclamation all trade of neutral nations with the enemy, and to treat as enemies those who did not act in compliance with the proclamation. Since the 17th century it is required by the law of nations, to announce a blockade so neutrals may have notice of it, and any attempt on the part of a neutral merchant to ship supplies to the infested ports is regarded a direct interference with the operations of the war, and his vessels and cargoes are liable to confiscation if captured. It is now the general practice to refer the questions involved in the violation of blockades to prize courts for adjudication, and where the cargo does not belong to the owner of the ship it is released, provided the owners of the cargo had no knowledge of the blockade at the time the shipment was started, but the ship is subject to confiscation by the captors. The term *blockade* is sometimes used to describe the condition of a city surrounded by the enemy and with which all outside communication has been cut off, but siege is the more common word employed to describe this condition.

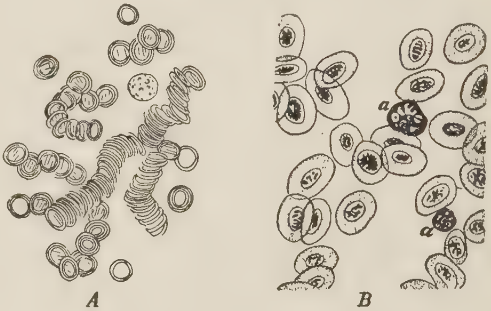
BLOCKHOUSE, a kind of fort used in early times as a means of protection against an enemy. It was constructed of timber, usually of heavy logs or blocks, and had openings for musketry on all sides to enable firing upon those making an attack. Originally it was built of one story, but later an upper story was constructed to overhang the lower and in the overhanging floors were holes to permit firing upon an enemy who might attempt to gain entrance or set the structure on fire. Blockhouses were used extensively in the early settlement of America, when timber was plentiful and attacks by artillery were not to be feared.

BLOCK SYSTEM, a system used in traffic on railroads by which signals are given so two trains on a single track may be kept a certain distance apart. The system owes its origin to Sir Charles Gregory of England, in 1841. It is now used by ninety-eight per cent of the double-track lines of England and most countries of Europe. In recent years all the great trunk lines of America adopted the block signaling system. It is in general use, not only on double-track railways, but by the principal single-track lines. By means of it the loss of property and human life is largely overcome.

BLOEMFONTEIN (blo͞om'fŏn-tīn), a city in South Africa, capital of Orange River Colony, 95 miles east of Kimberley. It is located on a plateau about 4,500 feet above the sea, on the Modder River, and is surrounded by a fertile region. Among the chief buildings are several schools, the Dutch Reformed church, the Anglican cathedral, the public library, and the government building. It is the seat of a hospital, an asylum for the insane, and a number of educational institutions. The trade is chiefly in wool, cereals, and merchandise, and the manufactures consist of utensils, machinery, and clothing. It has modern facilities, such as gas and electric lights, and is on the main line of the Cape-to-Cairo Railroad. At the time of the war between Great Britain and the Boer republics it was a center of hostilities, but in 1900 surrendered to Lord Roberts. Population, 1921, 26,929.

BLONDIN (blôn-dăn'), **Charles Emile Gravelet,** gymnast, born at Saint Omer, France, Feb. 28, 1824; died Feb. 22, 1897. He came to America in 1852 and toured the country as an acrobat, and while visiting Niagara Falls conceived the idea of crossing the cataract on a rope stretched over the stream near the location of the present cantilever bridge. The rope was about 1,200 feet long and 160 feet above the water, and on Aug. 17, 1859, he performed the feat in the presence of 50,000 people. He repeated the performance in 1860 in the presence of the Prince of Wales. While passing over the cataract, he gave various acrobatic performances, such as pushing a wheelbarrow and carrying a man on his back. Subsequently he returned to Europe and devoted most of his time to giving exhibitions at the Crystal Palace in London.

BLOOD, the fluid that circulates through the arteries and veins of animals and is essential to the growth of the tissues and to the preservation of life. In the human body it varies from a brownish-red to a bright red color. It constitutes by weight one-thirteenth of the body; thus, a man weighing 169 pounds has about thirteen pounds of blood. Under the microscope it appears as a pale yellowish fluid, called *plasma,* in which float a large number of discs, called *corpuscles,* some white and others red, of which the red are more numerous. The red discs are circular, with rounded edges, and concave on the upper and lower surfaces. These discs are so small that if 3,500 were placed side by side they would measure a linear inch, and about 15,000 placed one upon another would make a column about one inch high. It is estimated that about eighty-three million are contained in one cubic inch of blood. The size of the discs in human blood differs somewhat from that found in other animals, but it is uncertain whether miscroscopists can determine the difference with accuracy. They have



CORPUSCLES (HIGHLY MAGNIFIED).
A, Human Blood. *B,* Non-Mammal Blood.

a well known tendency to collect in piles like rolls of coins. With every breath about twenty million new discs are formed in the blood and the old as constantly die.

The plasma contains *fibrin,* a form of albumen which resembles the white of an egg, and various mineral substances, including potash, lime, phosphorus, magnesia, and iron. In the blood are all the materials required for the growth and maintenance of every organ. It is rich in albumen for the muscles and mineral matter for the bones. The red discs are the *air cells.* They carry the essential oxygen necessary to every operation of life, and it is carried to all parts where repairs are made and growth takes place. It stimulates action and tears down worn-out parts. In serving its purpose the muscles and tissues are burned much like fuel in a stove. Made impure by this action, the blood is caught up by the circulation and carried back to the lungs, where it is purified and again thrown back into the system. The vessels carrying the blood from the heart are called *arteries,* those carrying the blood back to the heart are called *veins,* and the two are connected by minute tubes about $\frac{1}{2000}$ to $\frac{1}{8000}$ of an inch in diameter, called *capillaries.*

When blood is exposed to the air, it forms clots; the process is called *coagulation.* This serves a useful purpose in many ways. It checks bleeding in ordinary cases by the fibrin forming a temporary plug, which is later absorbed when the healing process is finished. *Transfusion* is the process of restoring vigor in feeble persons by infusing healthy blood into their veins. In the 17th century it was thought to be the means of prolonging indefinitely human life. The blood of dogs and calves was experimented with by infusing certain quantities into the circulation of human bodies. It was found possible to restore breathing in animals and in one case a maniac was restored to reason. The practice proved objectionable in many respects, was forbidden by law, and later fell into disuse.

The blood of animals is an important commodity of commerce. It is used as an article of food, and for making blood sausage and blood cake. To prepare it a pan is placed at the mortal wound of the animal slaughtered, in which it is caught and whipped rapidly to gather the fibrin. The remaining parts, consisting of *albumen* and *serum* are the portions used as food. In large packing houses blood is one of the most important products of commerce. It is caught in large pans and carried to drying vats, where the albumen is coagulated into a thick mass. This mass is compressed by means of great hydraulic presses and sold for fertilizing. It is valued at $30 to $40 per ton. Blood is also valuable in the manufacture of buttons and Japanese lacquer work. Many of the richly colored buttons sold in the market are made of blood, which has been compressed by means of hydraulic machines, and afterward cut in shape by edged instruments.

BLOOD CIRCULATION, the movement of the blood in living bodies, consisting of the *systematic* and *pulmonic.* The blood is propelled from the left ventricle, thence passes through the aorta and its arterial branches, and reaches the capillaries in all parts of the body; it then passes into the small veins and from them into the larger ones, and is carried to the right auricle; this is the *systematic circulation.* The *pulmonic circulation* consists of its passage from the right ventricle into the pulmonary artery and its branches in the lungs, thence flowing through the capillaries, it collects in the pulmonary veins, and passes from them through the left auricle into the left ventricle from which it again enters the systematic circulation. The heart is the cause of circulation. It is aided by the chest movement in breathing, the elastic and muscular walls of the arteries, and the intermittent muscular pressure on the veins. Harvey (q. v.), an English physician, discovered the circulation of the blood in 1628, but how the blood passes from the arteries to the veins was not known to him. The capillaries and their functions were not discovered until three years after his death.

BLOODHOUND, a kind of dog distinguished for its keen scent and the persistency with which it follows the track of game. The ears are long and smooth, and both the ears and lips are pendulous. It is a trustworthy animal in the chase, and is employed to track escaped prisoners and suspects of recently committed crimes, though its value for the latter purpose is not generally conceded. The Cuban, English, and Russian bloodhounds are among the best known species.

BLOODROOT, a plant of the poppy order, native to many parts of North America. It takes its name from the sap of the root, which is a deep orange color, and contains the alkaloid *sanguinaria,* used in medicine as a stimulant and expectorant. The plant grows wild in many parts of Canada and the United States, has heart-shaped and deeply lobed leaves, and flowers early in the spring.

BLOOMER (blo͞om′ẽr), **Amelia,** dress reformer, born in Homer, N. Y., May 27, 1818; died Dec. 29, 1894. Her maiden name was Amelia Jenks and she married Dexter C. Bloomer in 1840. For some time she lived at Seneca Falls, N. Y., where she published *The Lily,* a periodical devoted to various social reforms. She advocated woman suffrage, temperance, and the so-called *bloomer costume.* In 1855 she removed to Council Bluffs, Iowa, where she resided until her death. She is not the originator of the costume named from her, but received the idea from Elizabeth Smith Miller and joined Lucy Stone and Elizabeth Cady Stanton in adopting it. This costume consists of a jacket with coat sleeves, a skirt extending a little below the knees, and loose trousers gathered in bands a little above the ankle. It is worn by woman gymnasts, golf players, bicylists, and horseback riders.

BLOOMFIELD, (blo͞om'fēld), a manufacturing city of New Jersey, in Essex County, five miles northwest of Newark, on the Erie and the Lackawanna railroads. It is situated on the Morris Canal and has a large trade in merchandise and produce. The chief buildings include the Jarvie Library, the Westminster and First Presbyterian churches, and the German Theological Seminary of Newark. The manufactures are paper, ironware, machinery, textiles, cigars, and musical instruments. Many New York business men reside here. It was settled in 1675 and was incorporated in 1812. Population, 1905, 11,668; in 1920, 22,011.

BLOOMFIELD-ZEISLER, Fanny, pianist, born in Bielitz, Austria, July 16, 1866. In 1868 she came to Chicago, Ill., with her parents, who provided for her musical instruction in America and at Vienna. While in Europe she studied under Leschetizky. She appeared in public as early as 1877, and in 1885 played in the most prominent musical centers of Europe. She toured England and Germany in 1898, France in 1902, and the leading cities of America in 1903 and 1905. Her eminent success easily won for her the distinction of being the leading pianist in her time.

BLOOMINGTON, county seat of McLean County, Illinois, 125 miles southwest of Chicago, on the Illinois Central, the Chicago and Alton, and other railroads. It is located on the highest land in the State and almost in the geographical center. It is surrounded by a rich agricultural country. The county courthouse, the public library, the city hall, and the central high school are among the chief buildings. It is the seat of the Major Female College, a Roman Catholic academy, and the Illinois Wesleyan University, and at Normal, two miles north, are the State Normal University and the State Soldiers' Home. The city has large railroad shops, flouring mills, a meat packing establishment, brickyards, foundries, and fruit canning interests. Waterworks, electric street railways, and gas and electric lighting are among the improvements. It was settled in 1831 and was incorporated in 1850. Population, 1900, 23,286; in 1920, 28,725.

BLOOMINGTON, county seat of Monroe County, Indiana, 50 miles southwest of Indianapolis, on the Illinois Central and the Monon railways. The chief buildings include the county courthouse, the central high school, and the Indiana State University. Among the manufactures are leather goods, machinery, and clothing. In its vicinity are productive limestone quarries. The municipal improvements include waterworks, sewerage, and electric lighting It was settled in 1818. Population, 1900, 6,460; in 1920, 11,595.

BLOOMSBURG (blo͞omz'bẽrg), a town of Pennsylvania, county seat of Columbia County, 40 miles southwest of Wilkesbarre, on the Philadelphia and Reading, the Lackawanna, and other railroads. It is nicely situated on the Susquehanna River and the Pennsylvania Canal. The surrounding country has lumber and farm interests. Among the industries are flouring mills, carpet factories, foundries, and textile works. It has a State normal school, several fine churches, and substantial county and public school buildings. Population, 1920, 7,819.

BLOWFLY (blō'flī), or **Flesh Fly,** a class of large flies, usually green or dark blue, which lay their eggs upon meat or dead animals. The eggs hatch in from 20 to 24 hours, and the young larva buries itself in the flesh for two weeks, when it transforms into the pupa stage, and develops into the matured blowfly about two weeks later. The eggs are called *fly blows* and are invariably laid on the lean meat. While in the larva stage the insects are known as *maggots,* and play an important part in the removal of the decaying carrion. However, the blowfly is somewhat dangerous to living animals in that it lays its eggs in fresh wounds, in which case the maggots may cause harmful effects.

BLOWING MACHINE, a mechanical contrivance for producing blasts of air. The earliest form was a bag made of skin or leather, from which the bellows used by blacksmiths was developed. Now blowing machines are very important in manufacturing and for various purposes, and they range from the simple fan blowers used in ventilation to the complicated piston blowing machines employed in driving rock drills and other machinery. The *piston blower,* or *Chinese bellows,* has been displaced largely by more powerful machinery. It has a square chamber of wood, fitted with a piston, which, when drawn back, admits air through a valve at the end, and the air is compressed and forced out through a nozzle when the piston is moved forward.

A modern blowing machine in which steam is used as a propelling force has two cylinders, one for steam and the other for air, usually set side by side, and has reached a high degree of perfection both in power and the efficiency with which it is used in different classes of machinery, especially in blast furnaces. Another class is known as *disk blowers,* which consist of several blades, usually six, fastened to an axle much like the blades of a screw propeller, and a swift current of air is secured when the axle turns rapidly inside of a cylindrical casing. The propelling force is either steam or electricity. It is used extensively in securing continuous currents of air in ventilating buildings, while the *fan blower,* which resembles it, is employed more generally in supplying air for mines. *Jet blowers,* in which steam creates a current of air in the direction of the escaping jet, are used to produce a draft in the smokestacks of fire engines and locomotives.

The *trompe* is a water jet blower, in which a current of air is created by streams or jets of water falling through a vertical pipe, the air being admitted at the top and forced by the falling water into an air-tight reservoir, from which it is piped for use, while the water gathers in a reservoir below and is drawn off through suitable openings. It has been superseded in most countries by newer machines. Recently a *rotary blower* has come into extensive use and with it greater pressure can be secured than is possible with either the disk or fan blowers. It has two devices known as *revolvers* set on horizontal shafts, which are moved by gear wheels outside of the casing, and when set in motion the air is drawn from below the casing in which they revolve and is forced out through an opening at the top.

BLOWPIPE, an instrument for blowing, used to direct the flame of a lamp, candle, or jet of gas against a spot on which is placed a body designed by the operator to be subjected to more than ordinary heat. While there are various kinds of blowpipes, the ordinary form consists of a conical tube of metal, open at the narrow end, which forms the mouthpiece, and closed at the lower part. From the side of the lower end projects a small brass tube, about an inch long, which serves for the passage of a fine current of air. When the operator blows into the open end, a current of air passes out through the air passage and causes the flame to be blown into a long point, much hotter than the common flame, owing to a greater supply of oxygen. Blowpipes are of great antiquity; a man using one is shown in an ancient Egyptian painting found at Thebes. They are used by chemists, jewelers, and gold and silver smiths.

BLUBBER (blŭb'bẽr), the fat which lies just beneath the skin of the whale and other large sea animals. In some whales it is from eight to ten inches thick, and under the lip it is sometimes three feet in thickness. A single whale often furnishes thirty tons of blubber, from which about twenty tons of oil are extracted. Blubber is eaten by the Eskimos and many inhabitants of the Japenese Islands. It is highly esteemed as a food by the natives because it contains elements that protect against severe cold.

BLÜCHER (blōō'kẽr) **Gebhard Leberecht von,** distinguished general, born at Rostock, Germany, Dec. 16, 1742; died Sept. 12, 1819. At the early age of fourteen he secretly entered the Swedish service to serve against Frederick II. of Prussia, but in 1760 was taken prisoner, and after a year's imprisonment entered the German military service. He commanded the forces against the French in the battles on the Rhine in 1793-94. In 1806 he fought with great vigor against the French at Auerstadt and gained minor victories, but was later taken prisoner. Soon after he was exchanged for the French general Victor and returned to the Prussian ranks. After the Peace of Tilsit had been concluded, he reorganized the department of war in Berlin and Königsberg. Subsequently he became commander in chief of the Russian and Prussian corps. In the battles of Lutzen and Bautzen he fought with bravery and was awarded the order of Saint George by Emperor Alexander I. of Russia. His success in the Battle of Katzbach, in 1813, when he defeated Marshal McDonald, caused Frederick William III. to create him Prince of Wahlstadt and to give him an estate in Silesia. In 1814 his army invaded France, and, though defeated in several engagements, he entered Paris in triumph. His service in the great campaigns of 1815 was especially valuable to the allied forces. On June 15 and 16 he was met by Napoleon at Ligny and defeated, but on the 18th his skillful attack directed against Napoleon on the rear and flank decided the great Battle of Waterloo, and caused the final defeat of Napoleon. Owing to his energy, indefatigable exertion, and rapidity of movements he was called *Marshal Vorwärts (Forward).* He was the recipient of many distinguished honors, and history fittingly designates him a model soldier and a skillful general. After the transportation of Napoleon to the island of Saint Helena, he retired to his estates of Krieblowitz, in Silesia, where he died.

BLUE (blū), one of the seven colors into which the rays of light are divided by refraction through a glass prism. The various shades of blue are seen in their highest perfection in the sea and sky, and are most brilliantly displayed in the sapphire and the turquoise. It is derived for dyes, in the arts, from various products of the vegetable and mineral kingdoms. Indigo, derived from the indigo plant, is the most common vegetable dye. Logwood blue is an extract of logwood. The minerals that yield blue coloring matter are very numerous. They include those known as aniline blue, cobalt blue, Prussian blue, and ultramarine. Cobalt blue, Berlin, and Bremen are the principal blues used in painting.

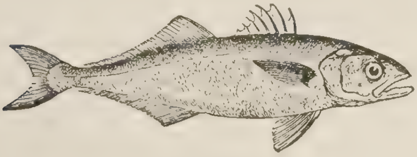
BLUEBEARD (blu'bẽrd), so named from the color of his beard, the hero of a well-known nursery tale. He is usually represented of great wealth and as the husband of a neighbor's daughter, whom he left a month after the wedding for a long journey, leaving the keys of the castle with his wife, but forbidding her to enter one of the rooms. Her natural curiosity caused her to open the door, and to her astonishment she found the bodies of all of Bluebeard's former wives. When Bluebeard returned, he found, by a spot of blood upon the key, that his wife had entered the forbidden room, and informed her that she must die. On begging for time to pray she was granted a short respite, which she turned to good advantage by sending her sister Anne to the top of the tower and thereby secured the assistance of two brothers, who dispatched Bluebeard. The story is variously told and largely circulated.

BLUEBIRD, or **Blue Warbler,** a well-known and favorite American bird, which appears in the northern part of the United States and Southern Canada in early spring, especially in populated regions. It is a common bird in the Bermudas, West Indies, Mexico, and Northern South America, and in some sections is known as a summer bird of passage. The plumage is sky-blue above and yellowish-brown below, and in size the bird resembles the robin. Bluebirds are fond of little boxes in which to nest, and frequently build close to houses and barns. The eggs number five or six, and several broods are reared each season. Both the male and female show much courage in protecting the nest.

BLUE BOOKS, the official papers and reports published by order of the British Parliament, so called because they are usually stitched up in blue covers. The practice of making published reports began in 1681, when the succession of the Duke of York to the throne of England was agitated. At present the blue books contain information relating to state matters, statistics of trade, and reports of committees. In Germany the corresponding official books are called white; in France, yellow; in Italy, green; and in Spain, red. In the United States the name *blue book* is applied to a report of the names and salaries of persons in the government employ.

BLUEFIELD, county seat of Mercer County, West Virginia, near the border of Virginia, on the Norfolk and Western Railroad. The streets are well improved by grading, drainage, and paving. It has many large buildings, including the high school, court house, and federal building. The chief industries are machine shops and trade in coal and merchandise. It was settled and incorporated in 1889. Population, 1920, 15,191.

BLUEFISH, a fish common off the northeastern coast of North America, closely allied to the mackerel. The upper parts are of a bluish color and the lower parts are white.



BLUEFISH.

BLUE GRASS, a permanent grass found in America and Eurasia. It is valuable for pasture on account of its growth both early and late in the season and its remarkable ability to bear pasturage. The Mississippi valley is especially celebrated for its prolific growth, where it has taken the place of native grasses in many pastures and meadows. It was first grown extensively in Kentucky, which is known as the Blue Grass State. This grass, though cut for hay in some places, is of greatest value for the lawn and pasture.

BLUE ISLAND, a city of Illinois, in Cook County, two miles south of the city limits of Chicago. It is located on the Calumet River and on the Grand Trunk, the Illinois Central, the Chicago, Rock Island and Pacific, and other railroads. It is the residence of many Chicago business men, having rapid transit facilities by electric lines and steam railway trains. Smelting works, oil works, brickyards, and machine shops are among the principal industries. It is important as a commercial and railroad center and has a brisk trade in merchandise and manufactures. It has many fine churches, schools, and business buildings. The first settlement was made on its site in 1833 and its incorporation dates from 1872. Population, 1920, 10,528.

BLUE LAWS, the name often applied to laws adopted in the middle of the 17th century for the early colonies of New England. Being stringent in their regulations of social life, much opposition to them was aroused among the more liberal colonists. The name is now applied to any legislation whose aim is to interfere with the personal and domestic liberties of an individual. Among the blue laws of New England were included the prohibition of a mother kissing her child on the Sabbath or on a fasting day. They provided a penalty for shaving on the Sabbath, an imprisonment of married persons not living together, a penalty for furnishing food or lodging to a Quaker, an imprisonment for debt, and a long list of other similar prohibitive measures.

BLUE MOUNTAINS, a range of mountains in New South Wales, Australia, which lie eighty miles inland and trend parallel to the coast. The highest point, Mount Beemarang, is 4,100 feet above the sea level. The same name is applied to a range of mountains in the eastern part of the island of Jamaica which includes peaks 8,000 feet high. Another range of the same name are the Blue Mountains in Pennsylvania, New Jersey, and New York, which lie east of the Blue Ridge, but they are more properly called the Kittatinny Mountains. A range in Oregon and Washington known as the Blue Mountains separates the Great Basin from the basin of the Columbia River.

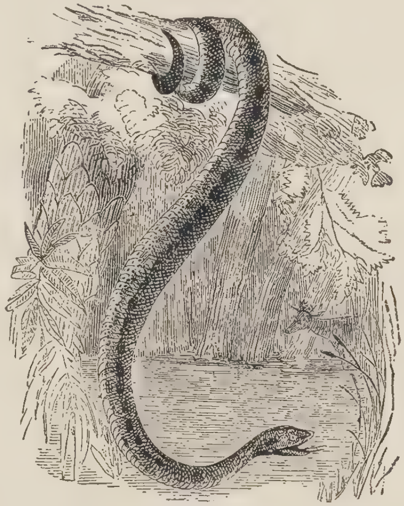
BLUEPRINT, in photography, a picture obtained by the use of a cyanide. To make a blueprint, the sensitive paper is prepared by brushing it with a solution of iron and oxalic acid, and afterward treating it with a solution of potassium ferricyanide. The drawing is made on a very translucent paper, such as vellum, under which the sensitive paper is exposed to light and receives a photographic imprint. It is then washed in pure water and the blue print is developed, after which it is dried. The cyanide is protected from the action of the sun by the lines of the drawing, and is dissolved and removed by washing, hence the black lines in the drawing appear as white lines in the picture. Blueprints may be developed either in sunlight or electric light. They are used extensively by architects and engineers for copying plans since any number of duplicates can be made with little expense.

BLUE RIDGE, the most easterly range of the Appalachian Mountains, bordered on the east by the Piedmont Plain. The range is known as Blue Ridge from the extreme northeast until it crosses the James River, thence to North Carolina as the Allegheny Mountains, and in North Carolina again as the Blue Ridge. This mountain range trends through Pennsylvania, Maryland, Virginia, North Carolina, and Georgia, and was the seat of the most important battles of the Civil War.

BLUFFTON, county seat of Wells County, Indiana, 25 miles south of Ft. Wayne, and on the Wabash River and on the Toledo and Western and other railroads. The features include machine shops, piano factory, clay works, sanitary sewers, and asphalt paving. It has a fine court house, city hall, high school, and public library. The place was settled in 1837 and incorporated in 1849. Population, 1920, 5,391.

BLUMENTHAL (bloo͞'men-thäl), **Leonhard,** field marshal, born at Schweldt-on-the-Oder, Germany, July 30, 1810; died Dec. 21, 1900. He attended the military academies of Culm and Berlin and was made an officer in the reserve guards in 1827. In order to secure a general military training, he served in all branches of the army. He was chief of staff in the campaign of 1866 against Austria. In the War of 1870-71 against France he was chief of staff to the Crown Prince of Prussia, in which capacity he participated in a series of engagements from Sedan until the capitulation of Paris, and subsequently became commander of the fourth army corps with headquarters at Madgeburg. He was raised to the rank of field marshal in 1888. The Emperor decorated him with marks of honor for services in a number of engagements.

BLUSHING, a sudden reddening of the face, due to a rush of blood into the capillary vessels of the skin. The cause is chiefly mental confusion, which results from surprise or apprehension, especially when accompanied with a feeling of modesty or shame. The passions and emotions influence the nervous system so they do not act regularly on the muscular coat of the capillaries, hence they enlarge and permit the entrance or passage of more blood than ordinarily, giving the cheeks a flushed or reddish appearance. On the other hand, fear and terror cause the face and lips to become pale by exciting the nerves to the extent that they cause the capillaries to contract, hence the flow of blood is diminished.

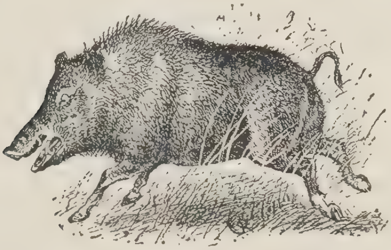

BOA CONSTRICTOR.

BOA (bō'ȧ), a genus of large serpents found in America, including the *chevalier boa,* the *emperor boa* of Mexico, and the *boa constrictor.* The last mentioned is so named because it entwines its prey and swallows it whole. Indeed, many of the species are equipped with jaws so constructed that the mouth may be dilated sufficiently to enable them to swallow bodies much thicker than themselves. These snakes are devoid of poisonous fangs. Their length is usually from twelve to twenty feet, but specimens fully sixty feet long have been captured. They have a reddish-gray color with broad stripes on the head and the body is covered with small scales. Their food consists chiefly of small quadrupeds, which they capture by leaping from trees or while hanging suspended from the branches. The true boas are distributed throughout tropical America, but are found most abundantly in Brazil and Guiana. Some species inhabit dry localities, others dense forests, while others frequent banks of lakes and streams, often living partly in the water. The water boa is known as the *anaconda* and attains a length of fully forty feet. It feeds on fishes and animals that come to the banks of the streams to drink, often lying in wait for them hidden away under water. It attains a great strength and is able to carry off poultry, swine, and young cattle. The *python* is found in Africa and Eurasia and is allied to the anaconda.

BOADICEA (bō-ȧ-dĭ-sē'ȧ), "the British Warrior Queen," a Queen of Britain in the time of the Roman Emperor Nero, wife of

Prasutagus, King of Iceni, who governed the portions of England now occupied by the counties of Suffolk and Norwalk. At the death of her husband she came into possession of his accumulated treasure of goods and money. This was seized by the Romans, which caused a protracted war. The Britons were commanded by the queen, who destroyed about 70,000 Romans, but met defeat in the year 62 A. D. Rather than be taken captive, she dispatched herself by poison.

BOAR (bōr), the name applied to either sex of the wild swine found in Africa, Asia, and Europe. These animals attain about the same size as the domestic hog, which is thought to have descended from the wild boar. They have coarser bristles and larger tusks than the domestic stock, and are vicious when attacked. In the swamps of Turkestan they abound in large numbers and in size exceed those of Africa. In Europe they are found chiefly in the forests under government protection. The flesh of the wild boar is valuable for food. Some regard it even superior to that of the domestic swine, as the animal feeds mostly on fruits and roots and is cleaner in its habits. The wild boar of India is a favorite animal of the chase and is pursued by mounted men, who look upon *pig-sticking* as a favorite sport.



WILD BOAR.

BOARDMAN (bōrd'man), **George Dana**, Baptist minister, born in Burmah, Aug. 18, 1828; died April 28, 1903. He graduated at Newton Theological Institute, Massachusetts, and became minister at Rochester, N. Y. Later he was chosen to a like position in Philadelphia. His prominence is due greatly to many able essays and addresses made by him against slavery. He published "The Kingdom," "The Epiphanies of the Risen Lord," "The Golden Rule," and "The Disarmament of Nations." His father, George Dana Boardman (1801 1831), was a prominent American missionary to Burmah, India.

BOARD OF TRADE, or **Chamber of Commerce**, an association of traders, merchants, or persons engaged in commercial pursuits to promote trade by a union of action, or attain advantages in trade by combinations which are beyond the reach of individuals acting separately. The first board of trade was established at Marseilles, France, and it was promoted partly for political advantages as well as to stimulate trade. The Chamber of Commerce organized in Paris in 1700 corresponded to similar institutions in other cities of France. In London, the Chamber of Commerce is the center of a general trade, while similar organizations at Liverpool, Hull, Leeds, and Manchester exercise a marked influence on the commerce of Great Britain. Associations to promote trade are maintained in Berlin, Hamburg, Copenhagen, Stockholm, and other European cities. Among the larger boards of trade in the United States are those of New York, Chicago, Boston, Baltimore, Philadelphia, Saint Louis, and San Francisco. The leading exchanges of Canada are at Montreal, Toronto, Quebec, Winnipeg, and Vancouver.

A custom long established and extensively practiced on boards of trade is to deal in margins by putting up with brokers an amount sufficient to cover the ordinary fluctuations of the market, while the other capital necessary is furnished by the brokers. Transactions on the board of trade are often intensely exciting, since large quantities of produce are frequently involved and even a very small rise or fall in the market price is an important factor. Many men follow trading and exchange as an occupation, while others engage in it as a speculation or side line to other business. Fortunes are sometimes made or lost in a day, especially when men of much experience and capital succeed in securing an artificial scarcity in a commodity of trade and sell when prices are abnormally high. Such a scarcity is said to be a *corner* on the market. The commodities handled on the board of trade include many lines, but cereals, live stock, lumber, and foodstuffs are the most common.

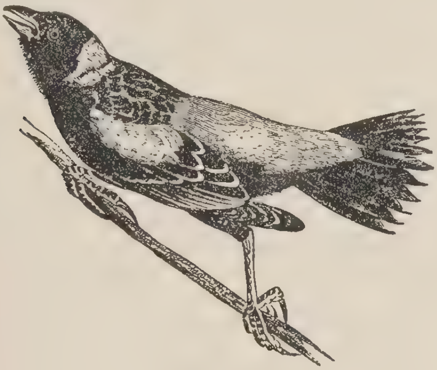
BOAT, the name of a small open vessel, usually propelled by oars or paddles. Boats are variously made for pleasure riding and for draught service, usually without sails, but some have one or more sails. A large class of boats of newer construction are propelled by electric motors and steam and gasoline engines. These boats have a capacity to move at the rate of ten to forty miles per hour. All steamships and passenger vessels carry boats to provide some degree of safety in case of accidents or shipwreck. They are variously named, as, for instance, launch, long, barge, pinnace, yawl, galley, skiff, gig, cutter, jolly, and dingy. Ships of war carry, among others, the first four named.

BOATBILL (bōt'bĭl), a bird of the heron family, native to South America. It was so named from the large bill, which is broad and shaped somewhat similar to a boat, the keel being uppermost. The lower mandible has a pouch to retain food. This bird frequents marshy places and the banks of rivers. It frequently perches on trees overhanging water.

whence it darts to catch fish and crustacean animals for food.

BOBBIN (bŏb'bĭn), a small spool or roller used in spinning. At each end is a flange or border, and through it is an opening to receive a pivot. The bobbin used in weaving has a flange on one end only, but the small metallic bobbin which holds the thread in the shuttle of a sewing machine has a flange on both ends. The common spool on which thread is wrapped is an example of a wooden bobbin.

BOBOLINK (bŏb'ō-lĭn̲k), a migratory bird of America. It is seen most frequently in the southern part of the United States, whence it passes northward in summer and to the West Indies and south in the winter. It is known in various sections as *ricebird, reedbird,* and *ricebunting.* The bobolink feeds on rice and other cereals, and is extensively used for food. In the Carolinas and other states of the South it is dreaded on account of its ravages in the fields of rice. When passing north from the rice fields of the South to the section farther north and to Canada, it is rich with fat and almost incapable of enduring long flights. The male is mostly black, sprinkled with white and yellow, and the female is largely marked with shades of brown. The song of the male is merry, quick, and musical.



BOBOLINK.

BOCCACCIO (bō̇k-kä'chō̇), **Giovanni,** famous Italian novelist and poet, born in Paris, France, in 1313; died at Certaldo, Italy, Dec. 21, 1375. He was the son of a Florentine merchant and a French woman, studied canon law, and devoted himself to literature. He fell in love with Maria, daughter of King Robert of Anjou, in 1331, whom he made famous in poetry and stories under the name of *Fiammetta.* Among his best known writings are "Il Filocopo" and "Tesside"; the latter was the first heroic epic in the Italian language. However, his fame rests on the work "Decameron," which consists of a hundred tales purporting to have been related in equal proportions in ten days by a party of ladies and gentlemen near Florence, while the plague was raging in that city. Many writers have drawn plots for romances and novels from this celebrated work of Boccaccio. In 1373 he was chosen to the professorship established at Florence in memory of Dante for the exposition of the "Divina Comedia," which position he held until his death. He was a close friend of Petrarch, with whom he was associated many years.

BÖCKH (bĕk), **Augustus,** classical antiquarian, born in Carlsruhe, Germany, Nov. 24, 1785; died in Berlin, Aug. 3, 1867. His brother, Frederick von Böckh (1777-1855), was prime minister of Baden. He studied in the University of Halle and became professor at the University of Heidelberg in 1807, where he taught successfully for two years. In 1809 he was elected to the chair of rhetoric and ancient literature at Berlin, a position he filled with much success for forty years, training many who became profound scholars, and extending his reputation throughout the learned circles of Europe. He lectured on the history of ancient religion, politics, literature, philosophy, and social life. His unexcelled writings opened new paths in the study of antiquity and still remain unsurpassed for clear exposition, subtle research, and surprising results. Among his best known works are "Political Economy of Athens," "Weights, Coins, and Measures of Antiquity," "Silver Mines in Laurion, Attica," "Lunar Cycles of the Greeks," and "Cosmical System of Plato."

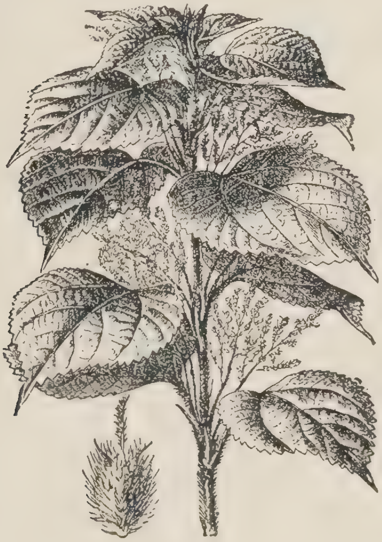
BOCHUM (bō̇k'ŏŏm), a city of Germany, in the province of Westphalia, 30 miles northeast of Düsseldorf. It is surrounded by a coal-producing country and is the seat of extensive iron and steel works. The general manufactures include woolens, hardware, machinery, cigars, and paper hangings. It owns and operates the municipal slaughterhouse, waterworks, and sewage system. Bochum is a modern city and its recent growth is due to the rapid development of its manufacturing enterprises. It has a public theater, a gymnasium, electric street railways, and stone and asphalt pavements. Population, 1920, 136,916.

BODE (bō'de), **Johann Elert,** astronomer, born in Hamburg, Germany, Jan. 19, 1747; died at Berlin, Nov. 13, 1826. He became devoted to the study of mathematical sciences and astronomy at an early age. He made a telescope for himself in the garret of his father's house, which he used as an observatory to study the heavens. At the age of eighteen he successfully calculated an eclipse of the sun, and in 1766 published his first treatise on the solar eclipse. In 1772 Frederick II. called him to Berlin and appointed him professor of astronomy in the Academy of Sciences. His long and faithful work in that institution was the means of adding much of value to the fund of astronomical knowledge. His works include "Astronomical Almanac" and "Celestial Atlas." The latter contains a catalogue of 17,240 stars

A mathematical formula known as Bode's Law, by which the distance of planets from the sun may be approximately expressed, owes its discovery to him. However, some ascribe the discovery of this law to Titus of Wittenberg.

BODLEIAN (bŏd'lê-an) **LIBRARY,** the library of Oxford University, England, organized by Sir Thomas Bodley in 1598 and opened in 1602. For rare collections it is excelled only by a few of the great libraries, although it is surpassed greatly in that respect by the Vatican in Rome. In it are copies of all the works published in Great Britain, and in addition to the English publications it contains numerous works issued in other countries. At present there are about 1,500,000 volumes in the library.

BOEHMERIA (bē-mē'rĭ-ȧ), a genus of plants native to China and the East Indies, important for the tough fiber used in making twine and rope. The plants belonging to this genus are related to the nettle, but do not possess the stinging properties. They yield the valuable rhea fiber, or grass-cloth fiber, known in commerce as *ramie*. The species from which this product is obtained principally is the Chinese grass. This plant is perennial, grows best in shade and moisture, and yields three crops in a season, new shoots coming up after each harvesting. It is cultivated in the southern part of the United States and the warmer parts of Europe. Species known as false-nettles are annual plants and grow in waste places in Canada and the United States.



BOEHMERIA.

BOEHM VON BAWERK (bēm vŏn bä'-vērk), **Eugen,** political economist, born in Brünn, Moravia, Feb. 12, 1851. After attending the schools of his native town, he took a course at the University of Vienna, and later studied political economy in Heidelberg, Leipsig, and Jena. In 1880 he was lecturer at the University of Vienna and subsequently was professor in the University at Innsbruck. In 1895 he was minister of finance of Austria, served as professor in the University of Vienna the following year, and in 1897 he was again minister of finance, subsequent to which he was a member of the House of Peers. He is noted as leading economist on account of his writings and discussions relating to financial and economical topics, but his chief achievement is the development of a theory of value, which is based largely upon psychological principles. Besides, he promulgated the so-called *Positive Theory of Capital,* and considered land and labor as the only real sources of production, to which he added capital as a primary productive influence. He published "Capital and Interest" and "Important Questions Regarding the Theory of Capital."

BOEOTIA (bē-ō'shĭ-ȧ), one of the ancient divisions of Greece, situated south of Phocis and west of the Euboean Sea, and now united as a province with Attica. The two as now organized contain an area of 2,475 square miles. Boeotia has an area of 1,635 square miles. It was one of the most progressive and celebrated divisions of ancient Greece, and is noted as the birthplace of the historian Plutarch, the general Epaminondas, and the poets Hesiod and Pindar. It was the seat of fourteen cities that formed the Boeotian League. The surface is quite level, but near its boundaries are chains of mountains. In the time of Alexander the Great a vast tunnel was constructed through the mountains to drain the district of the interior that was subject to overflow by the waters of the Cephissus, which discharges into Lake Copias, but later it became damaged and failed to discharge the water, thus rendering the district marshy and unhealthful. Extensive canals and tunnels were made in 1886, and now the district is rendered productive, though the atmosphere still remains heavy.

BOER (bo͞or), meaning farmer, the name applied to the descendants of the Dutch, German, and French who settled in South Africa in the 16th century and since. Their first settlements were made in the vicinity of the Cape of Good Hope, from which they spread over the territory now known as Cape Colony. Owing to English encroachments and annexation in 1795, many of them removed farther north to Natal, later to the Orange Free State, and still later across the Vaal River, where they organized the Transvaal Republic. They constructed railroads, built cities, developed agriculture and mining, and gave to South Africa a civilization and commerce never before known in that portion of the earth. Their governments of Cape Colony, Natal, Orange, and Transvaal were at all times constitutional republics. The Boers rank as a people of industry, splendid marksmanship, sober habits, and Christian devotion. See **Cape Colony.**

BOERHAAVE (bōr'häv), **Hermann,** celebrated physician of the 18th century, born near Leyden, Holland, Dec. 31, 1668; died Sept. 23, 1738. He studied Greek, Latin, Chaldee, and Hebrew at Leyden with the view of becoming a clergyman, but began the study of medicine in 1690. In 1693 he was granted the doctor's degree and entered upon a successful practice of medicine. Later he was chosen a lecturer at Leyden. His fame as a professional practitioner spread throughout Europe, and he was visited by patients in vast numbers, among them Peter the Great. Among his numerous important works are treatises devoted to botany and medicine. They include the celebrated work on chemistry known as Boerhaave's "Elements of Chemistry." Under his instruction the University of Leyden became known as the first school of medicine in Europe, and was attended by scholars from all parts of that grand division and from Asia. A fine monument was erected to his memory at Leyden in 1738.

BOG (bŏg), a morass or quagmire in which the soil is composed largely of decayed and decaying vegetable matter. Some bog districts yield large quantities of peat for fuel, while others are reclaimed by drainage and converted into the most productive soil. Large basins and lake beds have been redeemed in this manner. The soil, often from twelve to fifty feet deep, is enriched for production by decayed vegetable matter that has gathered for ages. In the Chatmos bogs of England and the Allen bogs of Ireland the deposits vary from ten to forty feet, and yield large quantities of peat and fuel materials. The largest lowland bog in the United States is known as the Great Dismal Swamp, in Virginia and North Carolina, which has an area of about 950 square miles and is 25 feet deep.

BOGARDUS (bō-gär'dŭs), **James,** inventor, born in Catskill, N. Y., March 14, 1800; died in New York City, April 13, 1874. He developed inventive skill at an early age. His first invention led to the construction of the eight-day clocks and an improvement in engraving machinery. He invented the dry gas meter, a deep-sea sounding machine, and a dynamometer. In 1847 he erected a factory in New York for casting irons to construct buildings, and was the first to use iron framework in architecture. He also invented dyes for printing postage stamps and appliances for manufacturing India-rubber goods.

BOGOTÁ (bō-gō-tä'), the capital of the United States of Colombia, South America, and the largest city in that country. It is located on a table-land 8,695 feet above the Andes, near Mount Guadalupe. The surrounding table-land district is fertile and produces large quantities of cereals and fruit. The climate is healthful, partaking of the nature of perpetual spring. Vast quantities of salt, coal, iron, gold, silver, and other minerals are mined in the mountains tributary to the city. The national capitol is a fine edifice, and, besides it, there are other public buildings, including national and provincial structures. A free library, an astronomical observatory, several theaters, a university, and a museum are among the public institutions. While the city does not have the thrift of North American cities, it is supplied with many modern conveniences, among them telephones, gas and electric lights, street railways, waterworks, and railroad facilities. However, the pack mule and other evidences of southern life are still largely manifest. The manufactures include soap, leather, clothing, cordage, porcelain, and machinery. Near the city is the cataract of Tequendama, in the Funeha River, where the water falls over a precipice 650 feet high, which furnishes an abundance of power. Bogotá is popularly called the "Athens of South America." Population, 1921, 142,580.

BOGUE (bōg), **David,** clergyman, born in Hallydown, Scotland, Feb. 18, 1750; died Oct. 25, 1825. He was educated at the Univeristy of Edinburgh and became a pastor in the Church of Scotland. After teaching for some time, he became pastor of an independent church at Gosport and the founder of an institution for the education of ministers. In 1795 he joined others in organizing the London Missionary Society and other institutions to promote religious work. He published "An Essay on the Divine Authority of the New Testament."

BOHEMIA (bō-hē'mĭ-ȧ), a region of Czecho-Slovokia, bounded on the northwest by Saxony, on the northeast by Prussian Silesia, on the southeast by Moravia and Lower Austria, on the south by Upper Austria, and on the southwest by Bavaria. It extends from latitude 48° 34′ to 51° 3′ north latitude and from 12° 7′ to 16° 50′ east longitude. The area is 20,060 square miles.

Description. The surface consists mostly of a high table-land surrounded by mountains. In the southwestern part is the Bohemian Forest, in the northwest are the Erzgebirge, and in the northeast the Riesen-Gebirge. The principal drainage is toward the north. Among the chief rivers are the Elbe, the Moldau, the Eger, and the Luschnitz. It has a continental climate, mild in the valleys and cold in the highlands, but it is healthful throughout the year. At Prague the temperature varies from 16° to 76°, and the average is about 49°. Snow covers the higher peaks most of the year. The rainfall is sufficient and abundant for agriculture.

The mines yield copper, iron, coal, alum, arsenic, sulphur, and antimony, though mining has not been developed to the extent of its possibilities. Coal is mined most extensively and supplies fuel for manufacturing enterprises. A fine grade of sand abounds, useful in the manufacture of glass, and granite, marble, and sandstone quarries are worked. Famous mineral springs abound at Carlsbad, Teplitz, and Marienbad. The forests are extensive and furnish valuable timber for export.

INDUSTRIES. Agriculture is the chief occupation and about ninety-eight per cent. of the surface is fertile. Most of the land is divided into small holdings and farming is conducted on a careful and economic basis. Fully sixty-four per cent. of the arable land is cultivated in cereals, such as wheat, rye, and maize, and potatoes, sugar beets, hops, fruit, and vegetables are grown profitably. All the domestic animals common to Europe thrive well, but special attention is given to cattle raising for flesh and dairy products. Sheep, goats, and horses take rank with swine in the value of the products, and large investments in poultry are maintained. Silk culture and bee-keeping receive careful attention in the districts adapted to these enterprises.

Bohemia has made rapid strides of advancement in manufacturing the past two decades. Glass is an important product and large quantities of glassware are manufactured for export. The textile industries and the manufacture of beet sugar have developed materially, and large steel and iron works are operated. Carlsbad china and Pilsen beer are made in large quantities for export. Clothing, cigars, paper, and machinery are other manufactures that take high rank. The knitting industry and the manufacture of toys and musical instruments receive considerable attention. Transportation is facilitated by navigation on the Elbe and Moldau and a network of canals, and a considerable mileage of steam railway and electric lines is operated.

GOVERNMENT. Bohemia was classed as a crown land of Austria, hence was an integral part of the Austro-Hungarian monarchy, which had its executive head in the emperor. Legislative power was vested in the Diet, consisting of an upper and lower chamber. In the government of Checho-Slavokia it forms the leading state, having about one-half the population of the entire republic. The legislative branch is vested in a Diet of two houses, the lower and the upper, to which members are elected by popular vote. In the national parliament Bohemia is represented by 148 deputies elected for six years and by 74 senators elected for eight years. Czech is the official language of the courts, although that is not the language of more than two-fifths of the people. At Prague are two noted universities, a German and a Czech. The system of schools is under state control.

INHABITANTS. The inhabitants number 315 to the square mile. About two-fifths are Germans and the balance are largely Czechs, including a small per cent. of Jews. Roman Catholic is the religion of most of the inhabitants, but some Protestant and Jewish churches are maintained. Prague, the capital, on the Moldau is the most important city. Pilsen, Reichenberg, Eger, Budweis, Teplitz, and Aussig are commercial centers. Population, 1921, 6,774,309.

HISTORY. Bohemia was occupied at the beginning of the Christian era by a Celtic people called *Boii*, and in the 1st century they were made tributary to the Germans. In the 6th century the region came into the hands of a Slavic race, who became known as the Czechs. They were warlike and held sway for several centuries against the attacks of the Goths and other people of Central Europe. Christianity was introduced about the year 900 by the Germans, while the Moravians, who resided in adjoining territory, were converted to the Greek Church. Powerful invasions were made by the Alemanni and other Germanic tribes, and Bohemia became a part of the Moravian kingdom of Svatopluk, who was vanquished by the Magyars in the early part of the 10th century. It remained a powerful kingdom from 1278 until 1305, extending from the Elbe to the Adriatic, and in the latter year became subject to the house of Luxemburg and later to the emperors of Germany. It was the seat of religious wars in the time of and subsequent to the Hussite movement, in 1400, and for many years remained Protestant. In 1526 it was merged with Austria and since has been governed by the house of Hapsburg. In 1848 a well organized effort was made to secure independence and reëstablish its former position among the nations, but the bombardment of Prague and several decisive battles ended the insurrection. The feeling of antagonism between the two chief elements, the Germans and the Czechs, has been sharply drawn at different times, each seeking preponderance. The Paris Peace Congress, in 1919, as a result of the great European War, separated Bohemia from Austria-Hungary and made it a part of the independent country of Czecho-Slavokia, of which it is an important state.

BOHEMIAN FOREST, a chain of mountains in Central Europe, between Bavaria and Bohemia, and extending from the Danube to the Fichtelgebirge. It separates the basins of the Elbe and the Danube and culminates in Mount Arber, which is 4,650 feet above the sea. Granite, iron ore, and gneiss deposits occur.

BOHOL (bō-hōl′), an island of the Philippines, located north of Mindanao and southwest of Leyte. It has an area of 1,440 square miles. The distance across it from east to west is about forty miles, and, from north to south, thirty miles. Groups of mountains and forests make up the principal part of the surface, but the soil is fertile and produces rice and many kinds of fruit. Gold and silver are mined. Population, 1920, 243,148.

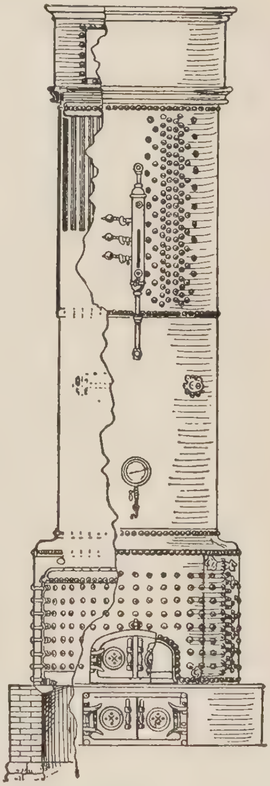
BOIES (boiz), **Horace,** public man, born at Aurora, N. Y., Dec. 7, 1827; died Apr. 6, 1923. He was admitted to the bar in 1849, and was elected to the State Legislature in 1858 as a Whig, but soon joined the Republican party. In 1867 he removed to Iowa, where he settled at Waterloo, investing largely in landed property. Becoming dissatisfied with the Republican tariff doctrine, he supported Cleveland in 1884. In 1889 he was elected Governor of Iowa by the Democratic party and reëlected in 1891. He was a prominent candidate for President in the two national conventions at Chicago in 1892 and in 1896. In 1902 he was an unsuccessful candidate for Congress.

BOIL, a swelling of the epidermal tissues, due usually to a change of diet and the habits of living. It starts in a small pimple, caused by poisonous bacteria under the skin, and becomes hard at the base and quite soft at the apex as it develops. For several days it is quite painful and highly inflamed, and when it opens a pus is discharged. The maturity of a boil may be hastened by the use of a poultice or the application of sulphide of calcium, and in some cases it is advisable to open it by lancing.

BOILEAU-DESPREAUZ (bwä-lō'dȧ-prā-ō), **Nicholas,** poet and critic, born near Paris, France, Nov. 1, 1637; died March 13, 1711. He studied in Paris with the view of becoming a priest and later took up the study of law, but decided to give his attention to literature. In 1660 he composed a satire based on the vices of Paris and recited it to a number of his friends, who included Racine and La Fontaine. This was followed by a few translations from the classics and several effusions on music and poetry. Louis XIV. employed him as his historian and allowed him a pension of 2,000 francs. In 1684 he was admitted to the French Academy. He exercised a wide influence upon the literature of France and to some extent upon the writers of England, especially Pope and Dryden. His masterpiece, known as "Poetic Art," contains rules and applies them to the epic, the dramatic, and the lyric poetry.

BOILER (boil'ẽr), a vessel for boiling liquids, usually constructed of iron or steel, and named from its particular use. In the list are included household boilers, used in the arts of cookery and for laundry purposes. The larger boilers employed in the industries are variously constructed. Those used for stationary steam generators are usually enclosed in brickwork, in order to prevent a loss of heat by radiation. In all modern stationary and portable engines the water is subdivided by a number of tubes, thus allowing free contact of the heat with the boiler surface, by which it is more rapidly and effectually distributed to the water. In recent years tubular or water-tube boilers have grown in popularity for the reason that they allow more grate area as well as heating surface, and facilitate a greater concentration of power within a small space. Boilers of this construction are used quite generally in steamboats and for warming buildings, as well as in factories and for portable purposes.

The *tubular boilers* as now made are mostly cylindrical in form and in regard to position are either *horizontal* or *vertical.* In these boilers the water is in small tubes instead of a single large one, as in the *flue boilers,* which have one or more large flues passing through the center. This causes a rapid generation of steam, as the fire and burning gases come in contact with a large surface area. The vertical boiler shown in the illustration is constructed on this plan. At the bottom are the *ash pit* and the *grate,* above which is the *furnace,* in which the fire burns. The *tubes* contain the water, which is brought to the boiling point as the fire surrounds them, and the steam collects at the upper part in the *steam dome.* A *steam gauge* indicates the pressure of steam and a *water gauge* shows the height of the water, while the *safety valve* permits the steam to blow off when the maximum pressure is reached. Wrought iron and steel are used in constructing the shell, the different parts of which are carefully fitted and securely riveted together to insure safety against explosions. Other materials used are brass, bronze, copper, cast iron, and malleable iron. Most small boilers and those used in the marine service are vertical, while the large boilers on land are chiefly horizontal. In the last mentioned the grate or furnace is located beneath the front end of the boiler or shell, hence the hot gases pass along the inner tubes to the rear end of the shell.



VERTICAL BOILER.

BOILING, an important operation in the preparation of food. It has the effect of softening nutritive articles, causing a solution of sugar and starch grains, and making them more easily digested. In boiling meats they should be suddenly plunged into boiling water so as to cause a coating or protective layer of coagulated albumen to form on the surface. This serves to retain the more nutritious portions within. After a few minutes the temperature may be considerably lowered. For soups and broths the meats should be heated gradually so as to allow the more nutritious elements to escape from the meat into the soup. Boiled food is more digestible than when stewed, roasted, or fried.

BOILING POINT, the degree or point at which any liquid boils. This depends upon the constituents of the liquid and the conditions of the atmospheric pressure. The boiling point is always the same, if the physical conditions are the same. It is highest at the level of the sea, and is lowered one degree Fahr. with every 597 feet of ascent; this is due to a decrease of atmospheric pressure as we ascend. After liquids begin to boil, their temperature is not raised. The following is the boiling point of the liquids named below; the degrees given are according to Fahrenheit's thermometer:

Mercury	662°	Water	212°
Sulphuric acid	610°	Nitric acid	210°
Olive oil	600°	Alcohol	173°
Phosphorus	554°	Bromine	145°
Iodine	347°	Sulphuric ether	113°
Naphtha	320°	Muriatic ether	52°
Oil of turpentine	314°	Ammonia	28°

BOISE (boi'zȧ), the capital of Idaho, county seat of Ada County, on the Boise River and on the Union Pacific Railroad. It occupies a fine site at the head of the Snake River valley, about 3,000 feet above the sea, and has a delightful climate. The chief buildings include the State capitol, the high school, the Soldiers' home, the United States assay office, and the penitentiary. It has manufactures of flour, lumber products, and machinery. Water power is secured from the river for irrigation and manufacturing purposes. The thermal springs furnish hot water for heating the buildings. Gold, silver, and other minerals are obtained in the vicinity. It was first settled in 1863, incorporated in 1865, and made the capital of the State in 1890. Population, 1920, 21,393.

BOJADOR (bŏj-ȧ-dōr'), a cape on the west coast of Africa, in north latitude 26° 7′. It is southeast of the Canary Islands, a projecting point of the Sahara, and is dangerous for navigation. It was discovered by the Portuguese in 1433.

BOKER (bō'kẽr), **George Henry,** poet and scholar, born in Philadelphia, Penn., Oct. 6, 1823; died June 2, 1890. His education was secured at Princeton, after which he studied law and traveled in Europe. On his return he produced a number of poems and plays for the stage, among them "Anne Boleyn," "Calaynos," and "Francisca de Rimini." President Grant appointed him minister to Turkey in 1871 and to Russia in 1875, serving eight years at the courts of these two powers. On his return he was elected president of the Union League, which position he held until his death. His best known production is "Poems of the War."

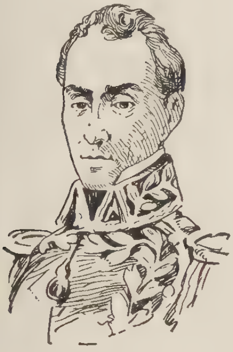
BOKHARA (bȯ-kä'rȧ), a state of Central Asia, formerly a part of Russia, since 1919 an independent Soviet government. It is bounded on the north by Turkestan, east by the Pamir region, south by Afghanistan, and west by the Trans-Caspian Territory. The area is 93,850 square miles. The Russian railroad from the Caspian Sea passes through the district from Charjui on the Oxus River to a point near Bokhara, and thence to Samarkand. Much of the surface is fertile, but arid, and large tracts of land are irrigated by water taken from the Zerafshan River. The mineral wealth embraces alum, sulphur, gold and slate. The silk production aggregates over 1,000 tons annually, and the yield of cotton is about 30,000 tons. Other products include cereals, domestic animals, minerals, and various Eastern manufactures. The important cities are Bokhara, Karshi, Hissar, and Charjui. The military forces consist of a standing army of 25,000 men. They are armed with Russian rifles and instructed in Russian military drill. The government of Bokhara is under an emir, who, in 1873, acknowledged Russian supremacy and granted concessions to the czar. In ancient times the district was called Sogdiana. It was conquered by the Arabs in the 8th century, and in 1220 by Genghis Khan, in 1370 by Timur, and in 1505 by the Usbeks. Bokhara is the capital, located near the Oxus River, southeast of the Aral Sea, and has a population of 92,350. It is surrounded by a mud wall, which was built anciently for the protection of the city against invaders. It contains 350 mosques and a number of other interesting edifices. Population, 1922, 2,563,500.

BOLAN PASS (bȯ-län'), a defile in the Hala Mountains of Baluchistan, on the highway between the table-land of Afghanistan and the Lower Indus River. It consists of a succession of ravines along the course of the Bolan River and is about 60 miles long. This river rises in the mountains and flows through the ravines with a rapid descent, about 90 feet per mile, and the eminences on each side rise abruptly 500 feet above the stream. The British constructed a military railroad through this pass to connect Sind with Kandahar.

BOLEYN, Anne. See **Anne Boleyn.**

BOLINGBROKE (bŏl'ĭn-bro͝ok), **Henry Saint John, Viscount,** gifted Tory statesman, born at Battersea, England, Oct. 1, 1678; died Dec. 12, 1751. He was educated at Eton and Oxford, traveled abroad for two years, and soon after returning secured political preferment under Queen Anne. In 1604 he entered the ministry as secretary of war, which position he held for four years. The two succeeding years were devoted to study in the country. He again entered the service as one of the secretaries of state in 1710. Two years later he became a member of the House of Lords, and in 1613 aided in negotiating the Peace of Utrecht. When Queen Anne died, he favored the Stuarts, and was compelled to flee to France for safety. He was permitted to return to England in 1723, but failed to get back into politics, although he made a number of efforts. Subsequently he settled in Battersea, the place of his birth, and became interested in literature by association with Swift and Pope. Besides publishing a number of political writings, he aided Pope by giving suggestions relative to his "Essay on Man" and published "Letters on the Study of History."

BOLIVAR (bŏl'ĭ-vẽr), **Simon,** called the "Washington of South America," born at Caracas, Venezuela, July 24, 1783; died at San Pedro, Paraguay, Dec. 17, 1830. After studying law at Madrid, he spent some time in extensive travels through Europe. He witnessed the closing scenes of the French Revolution, traveled in the United States, and proceeded to Venezuela to free that country from Spanish dominion. On July 5, 1811, independence from Spain was declared and war began at once. After several unsuccessful battles, he was compelled to flee for safety. In 1812 he joined the patriots of New Granada in their struggle against the royalists, and was enabled to return to his own country and kindle anew the spirit of revolution. On Jan. 13, 1813, he issued a proclamation of "war to the death," and within a few months entered Caracas in triumph, where he proclaimed himself dictator. In 1814 the royalists again possessed Caracas, which required him to flee to Jamaica. He next gathered insurgents in Hayti and proceeded to again open hostilities. On Aug. 7, 1819, he gained decisive victories at Bojaca and Tunja, and proceeded to Santa Fé, where he was chosen president. He at once proceeded to unite Venezuela and New Granada under the name of Colombia, with himself as president. Accordingly, he raised an army, crossed the Cordilleras, and forced the leading citizens at Caracas to swear allegiance to the republic.


SIMON BOLIVAR.

Bolivar proceeded south into Peru in 1823, where he was received with much enthusiasm. The southern part of that country was named Bolivia in his honor and made a separate state, of which he became president. Subsequently he returned to Caracas to suppress a rebellion and was reelected president. On May 25, 1826, he presented to congress a new constitution for the united states of Peru, Bolivia, and Colombia, but mistrust caused the Peruvians to organize a separate government and Venezuela seceded from Colombia in 1829. The congress of Bogotá voted him the thanks of the Colombian people and a pension of $3,000 with the condition that he would reside abroad, a request made in fear of his presence causing disturbances to those in power. He was buried at San Pedro, but his remains were removed to Caracas in 1842, where a splendid monument commemorates his patriotic interest in South American independence. Monuments have also been erected to his memory in Bogotá, Lima, New York, and other cities, and, like those of many great men, his services were not rightly estimated until after his death.

BOLIVIA (bō-lĭv'ĭ-ȧ), a republic of South America, in the western part of the continent. It is bounded on the north and east by Brazil, south by Paraguay and Argentina, and west by Chile and Peru. It extends from south latitude 8° to 22° 50', and from west longitude 58° to 73° 20'. The area is 557,430 square miles, exclusive of some territory held by Chile since the War of 1879-80.

Description. In the southwestern part are some of the most elevated summits of the Andes, including Mount Sorata and Mount Illimani, the altitude ranging from 15,000 to 21,000 feet above the sea. The western part has two parallel ranges of the Andes, which traverse the country from southeast to northwest. The general surface slopes toward the east and north, forming a large part of the central plain of South America. On the western boundary is the wonderful Lake Titicaca, with an area of about 3,250 square miles and a depth of 120 fathoms. In the north is Lake Rogagus, in the east is Lake Oberaba, and in the central west is Lake Poopo Choro. Most of the rivers rise in the western and central parts and belong to the Amazon and La Plata river systems. Among the chief rivers are the Pilcomayo, a tributary of the Paraná, and the Mamoré and Beni, which discharge through the Madeira into the Amazon. The Bermejo is an important river in the southern part of the country.

Bolivia has three climatic regions, the eastern llanos, the highland region, and the mountain region. In the eastern llanos the climate is humid and hot, in the highland region it is temperate, and in the mountain region it is cold. A favorable climate prevails in the region of the Medio Yunga, which embraces an elevated plateau. At La Paz, elevated 12,500 feet above the sea, the temperature averages about 50°.

Natural Resources. The forests are of incalculable value, cover a vast extent of the surface, and have many varieties of useful trees. Here thrive the mahogany, ebony, cork, cedar, rosewood, and many species of palm. A treeless region occupies the Bolivian highlands, where large areas are covered with nutritious grasses. The mineral resources are especially noteworthy. In the extent of productive silver fields Bolivia takes high rank, and gold deposits are likewise extensive. Other minerals found in paying quantities are copper, lead, tin, zinc, borax, coal, and manganese. Many wild animals infest the unpopulated regions, such as the puma, jaguar, tapir, and armadillo, and the birds of song and plumage, including the toucan, parrot, and pigeon, are very numerous.

INDUSTRIES. Mining continues to be the leading industry of Bolivia, but agriculture is gaining a larger foothold on account of the favorable conditions in the development of trade. It is known that gold was mined by the Incas long before the Spanish conquest, and interests in gold, silver, and tin mining have received special attention for a long period of years. In the output of silver Bolivia takes from third to fourth rank. The government has granted liberal concessions to those who open and operate new mines, and has extended appropriations to promote the construction of railroads as a means of securing transportation facilities to convey the ore to smelters and elsewhere.

Much of the land fitted for agriculture is owned by large investors and by the Indians. Farming is primitive, especially in the matter of cultivating the soil. It yields little more than is needed to supply the local demand, although the country is susceptible of large production. Many varieties of fruit are cultivated, especially the banana, pineapple, peach, lemon, fig, and the vine. All the cereals, such as wheat, corn, and barley, are grown, and considerable interest is taken in the cultivation of alfalfa, coffee, sugar cane, and vegetables. Stock raising is largely in the hands of Indians, who have herds of cattle in the grazing districts, and give some attention to the rearing of horses and sheep. Other animals reared to a considerable extent are mules, swine, alpacas, llamas, and vicuñas.

Little progress has been made in manufacturing, and the output consists mostly of wearing apparel and utensils. The exports embrace hides, rubber, coffee, wool, metals, lumber, and products derived from medicinal plants, such as cinchona and sarsaparilla. Germany has the largest share of foreign trade, and the trade with the United States and Great Britain is making a steady growth. Among the leading imports are cotton goods, furniture, and manufactures of iron and steel. Bolivia has no seaport, and foreign trade is carried on largely by the Peruvian port Molliendo and the Chilean port Antofagasta, from which railroads are operated to the inland points of the eastern part of Bolivia. The highways are in a bad condition and are improved only to a limited extent. Few railroads are operated and most of the mileage is made up of narrow gauge lines, but telegraph and telephone connections are quite common. Much of the inland trade is carried by pack animals, and rivers furnish an outlet to the Atlantic, but the distance across the continent is so great that the river trade has not been developed to any great extent.

GOVERNMENT. Bolivia is a republic and its government is organized as a representative democracy. The president, elected by direct vote for four years, is the chief executive, and is assisted by a vice president and five ministers. The legislative authority is vested in a congress of two houses, the senate and chamber of deputies. In the former are eighteen members, elected for six years, and the latter has 64 members, elected for four years. The system of department courts includes judges of district and supreme tribunals. The national supreme court is the highest judicial authority. Local government is administered by the eight departments, and these are divided into provinces and cantons. Education is free and obligatory, but the public schools do not provide sufficient facilities to accommodate those of school age and the compulsory school attendance law is not well enforced. The common schools are maintained by municipalities and cantons, and in addition there are eight colleges and six universities. Several theological seminaries and a number of missionary and parochial schools are maintained.

INHABITANTS. The white inhabitants are largely of Spanish origin, but immigration from Europe, especially from Germany, is adding quite a number of whites. Mestizos and Indians make up a large per cent. of the population. A number of the Indians are still uncivilized, especially the Guarani tribe. Roman Catholic is the religion of most of the people, but there is no restriction as to religious worship, and a number of Protestant churches and missionary schools are maintained. Sucre is the capital and La Paz is the largest city. Oruro, Cochabamba, Santa Cruz, Potosi, and Huanchaca are the leading cities. The population has not increased materially for twenty years, but there has been a steady growth, especially in the towns. Population, 1921, 2,267,935.

HISTORY. The history of Bolivia is characterized by many wars and insurrections. It was a part of the ancient empire of the Incas, and was conquered by Hernando Pizarro in 1538 for Spain. At that time it was made a part of Peru and later of the government of La Plata, but in 1825 was organized as a separate state and named in honor of Simon Bolivar (q. v.), who became its first president under a constitution drawn by him and adopted in 1826. In 1836 it was annexed to Peru under President Santa Cruz, but the union was soon set aside and Bolivia has been the scene of many revolutions and civil wars. Chile declared war against Bolivia and Peru in 1876, and as a result the port of Antofagasta and adjacent territory were lost to the Bolivians, thus cutting them entirely off the Pacific coast. A revolution took place in 1898, when a change was brought about in the administration by force of arms.

BOLOGNA (bṓ-lŏn'yȧ), an ancient city in Italy, capital of a province of the same name, located in a fertile plain near the Apennines, about eighty miles north of Florence. It is surrounded by a brick wall and penetrated by canals, which serve as arteries of commerce. The city is adorned by many palaces in which are historic paintings of the leading artists of Italy. As a whole the general architecture is massive and substantial, but the styles are mediaeval in appearance, since the façades of most of the buildings overhang the second story. A number of monuments adorn the parks and squares. The principal buildings include the Palazzo del Podestà, the Palazzo Publico, and the basilica of Saint Petronio, the largest church in the city. The leaning towers, Degli Asinelli and Garisenda, built in the 12th century, are among the noted structures in the city. There are over one hundred churches remarkable for beauty and wealth. Near the city is the church of Madonna di San Lucca, at the foot of the Apennines, which is reached by an arcade of 640 arches. Other noted buildings include the university, the Academy of Fine Arts, the city hall, and many schools and hospitals. It has manufactures of clothing, macaroni, silk and linen textiles, leather, canned fruit, and machinery. Among the modern facilities are steam and electric railways, gas and electric lighting, and pavements of stone and asphalt.

Bologna was founded by the Etruscans and is counted one of the oldest cities in Europe. It became a Roman colony in 189 B. C. In 728 A. D. it was taken by Longobards, but later was held by Charlemagne, who made it a free city. Since 1860 it has been a part of Italy. It contains some of the most interesting and beautiful edifices and adornments of antiquity and is visited by many who travel for study. Population, 1922, 172,009.

BOLOGNA, University of, an institution of higher learning at Bologna, Italy, noted as one of the most famous centers of education in the world. It is thought that the foundation was laid at the beginning of the Christian era, but its early history is obscure, and, according to some writers, it was founded by Theodosius in 425. Subsequently it was destroyed as a result of wars and insurrections, but Charlemagne restored and enlarged it. In point of attendance it reached its greatest prosperity during the Middle Ages, when it had about 8,000 students, but with the rise of the great universities in Germany the attendance began to decline and at present the enrollment is about 1,500. The scholars who made this institution famous include Luigi Galvani, Vesalius, Mme. Mazzolini, and the female professor Clotilda Tambroni. It is coeducational, and is equipped with a library of 260,000 volumes and excellent chemical and physical laboratories. The faculties include those of mathematics and sciences, philosophy and letters, medicine and surgery, jurisprudence, pharmacy, engineering, drawing and architecture, politics, and veterinary surgery.

BOLOMETER (bṓ-lŏm'ḗ-tẽr), an instrument used to measure minute quantities of heat, especially in different portions of the spectrum. It is sometimes called *actinic balance* and *thermic balance.* The essential part is an electrical apparatus known as Wheatstone's Bridge, which has two arms, one of which consists of three strips of platinum blackened and exposed to the rays of the sun, and the other arm is connected with a small but sensitive galvanometer. A current of electricity is developed as soon as the platinum area is exposed to the sun, owing to the fact that it is highly sensitive, and the degree of heat is indicated by the needle of the galvanometer. This instrument, though so delicate that it is influenced by minute changes of temperature, is the most reliable device for studying radiation.

BOLSHEVIKI (bṓl-shē'vē-kē), the name of the political party in Russia which favored a peace treaty at the end of the third year of the Great European War. It developed great strength under the leadership of Nikoli Lenine and Leon Trotzky, in 1917, in opposition to Alexander F. Kerensky and the party that wanted to continue the war in conjunction with the Entente Allies. The peace conferences at Brest-Litovsk resulted from the activities of the bolsheviki.

BOLTON (bōl'tŭn), or **Bolton-le-Moors,** an important manufacturing city in Lancashire, England, on the Croal River, about ten miles northwest of Manchester. The chief buildings include the town hall, two museums, the church of Saint Peter, the public baths, and five public libraries. Large quantities of coal are mined in the vicinity. It was noted for its manufacture of cotton and woolen goods as early as the 14th century, when Flemish merchants stimulated the industry. Population, 1921, 180,885.

BOMA (bō'mȧ), the capital of the Congo Free State, on the Congo River, not far from its entrance into the Atlantic. It is regularly platted and has a number of fine buildings, including those erected by the government. The largest vessels enter its port, giving it direct steamship communication with Ostend, Antwerp, and other cities of Europe. It has a large interior and foreign trade, manufactures of utensils and clothing, and is the political center of the district of Boma and the country lying inland. Population, 1921, 4,360.

BOMB (bŏm), an agent of destruction used in war. It is usually a large iron ball or shell filled with explosives and fired from a mortar or howitzer. Bombs are provided with a time or percussion fuse. They were first used at Naples in 1434. The conical shells fired from rifled cannon have largely supplanted the older bomb. A class of bombs to be thrown by hand are sometimes used with murderous effect. The most noteworthy instances of such use in the latter part of the last century were at Saint Petersburg, Madrid, and Paris. They are constructed of a shell filled with high explosives, together with nails, scraps of iron, and bullets. The explosives used are nitroglycerin, fulminate of mercury, or chlorate of potash and picric acid. The explosion in the common bomb is effected by concussion, and in those depending wholly upon chemical action, as in one containing picric acid and chlorate of potash, it is effected by a coming together of the two liquids.

BOMBARDIER BEETLE (bŏm-bẽr-dẽr′), a kind of beetle found in temperate and tropical countries. Many species have been described. Fully 25 species are found in different parts of the United States and Mexico. These beetles are remarkable for the secretion of a pungent fluid in the anal glands, which, when they are attacked by an enemy, is discharged with explosive force as a means of protection. This fluid somewhat resembles nitric acid in that it leaves a stain and has a burning sensation when applied to the skin. Immediately on making the discharge, the insect makes good its escape, but, if needed as a means of defense, the fluid can be thrown out several times consecutively.

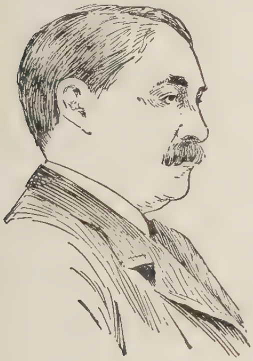
BOMBARDMENT (bŏm-bärd′ment), the act of attacking a city or fort by throwing bombs and shells to destroy the buildings and fortifications. This manner of attack is made chiefly on the larger cities and more important fortresses, usually on those that occupy a strategic point or in which a powerful army or valuable stores are kept by the enemy. In modern times most bombardments involve both naval and military operations. The attacking party usually gives notice of the impending attack 24 hours before opening fire in order that noncombatants may protect their lives and property by moving out of the range of the guns, though in some cases the enemy is surprised by a sudden attack, when no notice is given. In many cases excavations are made underground or bomb-proof masonry is built as a means of protecting life. Sebastopol, in the Crimean War, is an example of heavy bombardment, and the Dardanelles, upon which the Allies made futile but repeated assaults, is an instance of combining the naval and military operations with unusual vigor.

BOMBAY (bŏm-bā′), the chief seaport city of India and capital of a province of the same name. It is located on a small island in the Arabian Sea, which was visited by the Portuguese in 1509 and annexed by them in 1532. It was ceded to Charles II. as a part of the dowery of his bride, the Infanta Catharine. In 1668 it was transferred to the East India Company, and in 1685 became the principal presidency of their possessions. There is a closer resemblance between it and European cities than is seen in any other city of Asia. The harbor is one of the finest in the world, and is both commodious and sufficiently secure for the heaviest ironclads. It has many substantial business blocks and magnificent homes in the newer suburban districts, where the larger numbers of its European inhabitants reside. The public buildings include the customhouse, the city hall, the public mint, several cathedrals, the offices of public works, the government courts, and the university. It has a well-organized and liberally patronized public school system, which is supported by taxation and government grants. Bombay has extensive manufacturing enterprises. The products include machinery, clothing, earthenware, textiles, and utensils. Its export and import commerce is very extensive, each aggregating about $175,000,000 annually. The city has railroad connections with the country in all directions, is lighted by electricity, has street railway service, and is extensively connected by telegraph and telephone lines. Although the city presents elements of prosperity, it contains many poor and destitute. The life of the native laborer is one of misery and destitution, often reaching the point of starvation. Large numbers of the poor die in consequence of the famines that are quite frequent in western and northwestern India. Population, 1920, 981,565.

The province of which Bombay is the capital lies in the western part of India. It is bounded on the north by Baluchistan; east by Rajputana, Central India, the Central Provinces, Besar, and Hydenabad; south by Mysore and Madras; and west by Baluchistan and the Arabian Sea. The area is 184,235 square miles, of which 122,778 square miles are under direct British administration. The climate at Bombay is unhealthful, owing to its low and moist location, but toward the northeast the district is favorable to Europeans. The chief rivers include the Indus, Tapti, and Nerbudda. Among the mineral deposits are gold, iron, coal, salt, and petroleum. The rainfall is very heavy in the coast district, sometimes reaching 300 inches, and heavy monsoons are frequent. Large areas still contain valuable forests, but in some regions deserts and saline lakes abound. The agricultural products embrace rice, wheat, barley, millet, cotton, and many varieties of tropical fruits. Railroads have been built through all the fertile districts, on which are located numerous cities with large populations. In 1907 the lines in operation had a length of 6,890 miles. The government of the district is administered by a resident governor, appointed by the crown, and a local legislative council. For administrative purposes it is divided into the four divisions of Central, Northern, Southern, and Sind. Population, 1921, 19,840,520.

BONA (bō′nȧ), or **Bône,** a seaport city of Algeria, on a bay of the Mediterranean, 85 miles northeast of Constantine. It has a good harbor and a large interior and foreign trade, and is connected with Constantine, Algiers, and other cities by railway. The chief buildings include those erected by the government and a number of mosques and churches. It has manufactures of tapestry, clothing, saddlery, and earthenware, and its trade is chiefly in live stock, wool, cereals, wax, fish, and tobacco. Iron mines and marble quarries are worked in the vicinity. The French have occupied Bona since 1832, from which time it has been growing steadily in commercial importance. Population, 1922, 42,934.

BONANZA (bȯ-năn′zȧ), a term applied originally to the discovery of a vein of rich ore in a mine. It came into use in connection with the Comstock Lode in Nevada, where a number of rich deposits were found. Now it is used in speaking of any successful enterprise or good fortune. The term is one of the popular Americanisms (q. v.).


C. J. BONAPARTE.

BONAPARTE (bō′nȧ-pärt), **Charles Joseph,** statesman, born in Baltimore, Md., June 9, 1851. He is a grandson of Jérôme Bonaparte, King of Westphalia. In 1871 he graduated at Harvard University and in 1874 at the Harvard Law School, and began a successful practice in Baltimore, where he became prominent in reform movements. In 1902 he was made a member of the board of Indian commissioners, and two years later was chairman of the council of the National Civil Service Reform League. President Roosevelt made him Secretary of the Navy in 1905. He was succeeded by Victor H. Metcalf in 1907, when he became Attorney General. He died June 28, 1921.

BONAPARTE, Elizabeth Patterson, first wife of Jérôme Bonaparte, born in Baltimore, Md., Feb. 6, 1785; died April 4, 1879. She first met Jérôme Bonaparte, then a youth of nineteen, at Baltimore, who proposed marriage, which she accepted. The marriage was opposed by William Patterson, father of Elizabeth, and by Napoleon, brother of Jérôme. She was not permitted to land when reaching Lisbon, Portugal, and Jérôme proceeded to Egypt to consult with Napoleon, while Elizabeth sailed for Camberwell, England, where her son, Jérôme Napoleon Bonaparte, was born. The marriage was annulled in France by the imperial council of state, and on the application of Elizabeth she was granted a divorce in the courts of Maryland, though she sought by every legal means to maintain the right of her son to inherit the throne. She visited Europe after Napoleon's defeat at Waterloo, and again in 1819. She left a fortune of $1,500,000 to her grandsons, sons of Jérôme Napoleon Bonaparte.

BONAPARTE, Jérôme, the youngest brother of Napoleon I., born at Ajaccio, Corsica, Nov. 15, 1784; died June 24, 1860. He studied in the college of Juilly, but soon entered the naval service in the Mediterranean, and later in the West Indies. In 1803 he married Elizabeth Patterson, the daughter of a Baltimore merchant, which was repudiated by his brother, and his wife was not permitted to enter France. He became King of Westphalia in 1806, and shortly afterward married a daughter of Frederick, King of Württemberg. After the second abdication of Napoleon, he retired to the kingdom of his father-in-law, and subsequently became governor of the Invalides and in 1850 was made marshal of France. The son of his first wife, Jérôme Napoleon Bonaparte, graduated at Harvard and spent much of his life in France. He died in Baltimore, Md., June 17, 1870.

BONAPARTE, Joseph, eldest brother of Napoleon I., born at Corte, Corsica, Jan. 7, 1768; died at Florence, Italy, July 28, 1844. His education was secured at the college of Autun, France. Afterward he studied law and returned to Corsica, where he became a member of the administration of Corsica under Paoli, in 1792. When his brother, Napoleon Bonaparte, rose to power, he entered upon a successful diplomatic and military career. In 1806 he became King of Naples with the name of Joseph, and two years later was made King of Spain. His dominion depended entirely upon the power of the French army, which proved insufficient to put down the Spanish insurgents, and he returned to France in 1813. After the success of the allied armies at Waterloo, he came to America and engaged in the pursuit of agriculture at Bordentown, N. J. While in America he assumed the title of Count de Survilliers. He returned to Europe in 1832, and in 1841 went to Florence, where his wife resided.

BONAPARTE, Louis, brother of Napoleon I. and father of Napoleon III., born at Ajaccio, Corsica, Sept. 2, 1778; died July 25, 1846. He was educated at the school of Chalons and accompanied his brother in the Italian campaigns and to Egypt. Distinguishing himself as a military man, he rose to the rank of brigadier general. He was induced by his brother to accept the crown of Holland, but to this responsibility he consented with reluctance. He administered the affairs of state with considerable ability, and sought in every way possible to promote the welfare of his subjects. His administration was not satisfactory to Napoleon, which caused him to abdicate at Haarlem, July 1, 1810, after which he retired to Rome to spend most of the remainder of his life. He was deeply affected by the death of his oldest son in 1831 and by the unsuccessful attacks of Louis Napoleon at Strasburg and Bologna. Bonaparte married Hortense Beauharnais, the daughter of Josephine, in 1802. His death resulted from an attack of apoplexy.

BONAPARTE, Lucien, prince of Canino, born in Ajaccio, Corsica, March 21, 1775; died at Viterbo, Italy, June 29, 1840. His education was secured at Autun, Brienne, and Aix and was both liberal and well directed. He took up his residence at Marseilles in 1793, where he held several positions in local government and distinguished himself as a politician and republican orator. In 1798 he settled in Paris, where he soon became a member of the Council of Five Hundred, and the following year was made president of the Council. While in this official position he contributed largely to the downfall of the Directory and Napoleon's ascent to power, Nov. 9, 1799. Napoleon sent him as ambassador to Spain and he afterward withdrew to Italy, where he devoted himself to sciences and arts, wholly indifferent to the military and political successes of his brother. He was offered the crown of Italy and Spain, but refused. After the final defeat of Napoleon, he took up his residence permanently in Italy as a student of science and literature, and later was made prince of Canino by Pope Pius VII. He published several works of merit, among them a description of Etruscan antiquities.

BONAPARTE, Maria Letizia Ramolino, mother of Napoleon I., born in Ajaccio, Corsica, Aug. 24, 1750; died Feb. 2, 1836. She married Carlo Bonaparte in 1767, who died in 1785, and subsequently removed from Corsica to Marseilles, where she was supported by a pension. When Napoleon became emperor, in 1804, she received the title of Madame Mère, and after his downfall she lived in Rome. She was considered a woman of personal beauty and frugality and possessed much energy and pride.

BONAPARTE, Napoleon. See **Napoleon I.**

BOND (bŏnd), **Sir Robert,** statesman, born at Saint John's, Newfoundland, Feb. 25, 1857. He studied law, but decided to take up a political career, and entered the legislature of the colony in 1882. Two years later he was made speaker of the House of Assembly and was appointed executive counciler with the portfolio of Colonial Secretary in 1889, which he held until 1897, when he was appointed a delegate to act for Great Britain on the questions involved in treaties with France. Soon after he was appointed to assist Lord Pauncefote in negotiating a reciprocal treaty with the United States, and was instrumental in completing what is known as the Bond-Blaine convention. Subsequently he was prominent as a factor in making treaties relating to fisheries. In 1902 he concluded with the United States negotiations for reciprocal trade relations between that country and Newfoundland, known as the Hay-Bond treaty. He was honored by membership in a number of important commercial and political associations and delivered numerous impressive and scholarly addresses.

BONE, the hard material that constitutes the skeleton or framework of mammals, reptiles, and birds. Its three purposes are to preserve the shape of the body, to protect the delicate organs and to serve as levers on which muscles may act to produce motion. In the early stages of life bones consist of *cartilage,* that is, cells massed together, except in the flat bones of the skull and shoulder blade, which consists largely of *fibrous tissue.* At maturity they contain about one part of animal and two parts of mineral matter. The proportions vary with the age; in early life they consist of nearly one-half to one-half, while in old age the mineral matter is greatly in excess. The mineral matter may be dissolved by soaking the bone in weak muriatic acid, which will make it possible to bend it like rubber. The animal matter may be burned in fire, the remaining portion forming a brittle mineral mass. From this it may be seen that bones obtain their elasticity from animal matter and their hardness from mineral substances.

The cartilage found in young persons or animals turns gradually into bone by a process called *ossification,* but the portions near the joints are long delayed in ossifying, as a means to overcome to a great extent the shock of a fall or sudden jar. For this reason the bones of children are tougher than those of older people, and are less readily fractured and heal much quicker. In the body bones are moist, pinkish white in color, and covered with a tough membrane called *periosteum.* The interior is filled with marrow and permeated with blood vessels. All portions contain little cavities, from which tiny tubes radiate that serve as passages for the blood vessels to nourish the bones. These vessels permit the blood to circulate as freely through the bones as any part of the body, supplying new material when needed and carrying away the worn out parts. From the broken ends of a bone the blood oozes and soon forms a gristly substance, which holds them in place. The blood then slowly deposits bone matter, and in about six weeks a broken bone becomes united.

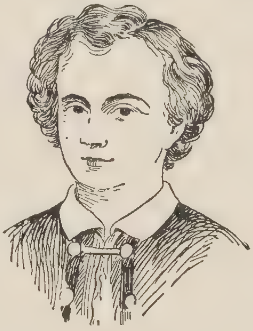
The bones of the human system resemble those of other animal organisms, but in shape and structure are peculiarly adapted to serve the human body. For convenience in study they are considered as bones of the three divisions: the *head,* the *trunk,* and the *limbs.* In form they are flat, as the shoulder blade; long, as the bones of the limbs; and short and irregular, as those of the wrist and ankle. The bones of the head are classified as eight skull and fourteen face bones. These bones form a cavity for the protection of the brain and the organs of hearing, taste, smell, and sight. All these are immovable, except the lower jaw, which swings on a hinge. The bones of the trunk include eight in the cervical region, thirty-seven in the thorax, five in the lumbar region, and four in the pelvis. The bones of the limbs include sixty-four in the upper extremities, and sixty in the lower extremities. The total number of bones in the body is about 210, these differing somewhat according to age, since several bones unite later in life. The size, form, and structure of the bones depend entirely upon the purpose they are to serve. Some are round and hollow and add lightness and strength; others are flat and broad to admit of large muscular attachment; while still others are short and solid to enable rapidity and facility in movement and to supply sufficient strength.

The bones of animals are gathered from slaughter houses and converted into articles of commerce. Ground into powder, they supply a valuable fertilizer for the production of cereals, vegetables, and fruits. In some localities their fats are first extracted, which are used in the manufacture of soap and lubricants. In powdered form they are prescribed as medicines and add largely to the elements that build up a system wanting in material strength. They also serve for making handles in cutlery, for sugar refining, and for making boneblack.

BONEBLACK, or **Animal Charcoal,** a commercial product obtained by heating bones in closed retorts, until the gases escape and the residue is carbonized. The portions remaining in the vessel weigh about half as much as the original bones. They are reduced by passing them between rollers and separated by means of sieves into different grades, the sizes ranging from small grains to particles as large as navy beans. Boneblack is used to decolorize liquids, such as the syrup of sugar, and is employed to deodorize and to separate mineral substances from their solutions. Animal charcoal serves to remove the chemical impurities from water, but its use in refining sugar is the most important. Deodorization and decolorization take place by allowing the substances to be purified to percolate through layers of the charcoal, and in some cases the liquids are filtered several times to secure the best results After using the boneblack a number of times it becomes saturated, when the ability to absorb may be restored by reheating it.

BONESET, or **Thoroughwort,** a perennial plant of America, distinguished by large hairy leaves, light purple flowers, and a stem from three to five feet in height. The leaves and flowering tops have a bitter taste and are used as a tonic. Boneset tea is made by steeping the leaves in hot water, and, when taken in this form, as warm as possible, it produces perspiration. It is recommended for ague, influenza, and muscular rheumatism.

BONHAM (bŏn'am), a city in Texas, county seat of Fannin County, about thirty miles east of Sherman, on the Denison, Bonham and New Orleans and the Texas and Pacific railroads. It is surrounded by a fertile region and is a market for tobacco, cereals, and cotton. Among the chief buildings are the county courthouse, the Carlton College, and the Bonham Masonic Institute. The manufactures include cigars, flour, machinery, vehicles, and textiles. It has waterworks, electric lighting, and a large trade in farm produce. Population, 1900, 5,042; in 1920, 6,008.


MARIE ROSA BONHEUR.

BONHEUR (bô-nûr'), **Marie Rosa,** famous animal painter, born at Bordeaux, France, March 22, 1822; died at By, France, May 25, 1899. Her education was directed by her father, Raymond Bonheur, an artist, who died in 1853. The first of her works exhibited in the Salon were "Two Rabbits" and "Goats and Sheep." In 1849 she produced her famous painting, "Plowing with Oxen." now in the Louvre. Her well-known "Horse Fair" attracted much attention at the Salon in 1853, and was bought by Cornelius Vanderbilt in 1887 for $53,500 and presented to the Metropolitan Museum of Art, New York. After the capture of Paris by the Germans in 1870, her studio was visited by the Crown Prince of Prussia and by his order it was protected from damages. She wore a masculine costume in attendance at horse fairs and other places of interest to gather models for her work. As a means of studying the habits and characteristic positions assumed by animals she kept a menagerie of her own to paint from it the real and beautiful in nature. The honors bestowed upon her include membership in the Institute of Antwerp, in 1868; the Cross of the Order of Leopold from the King of Belgium, in 1880; the Cross of the Order of Isabella the Catholic from the King of Spain; and the Cross of the Legion of Honor. Besides those named above, her works include "The Haymaking Season in Auvergne," "Sheep at the Seaside," "The Lion at Home," "High Life and Low Life," and "The Stampede."

BONHOMME RICHARD (bô-nŏm′), the flagship used by John Paul Jones (q. v.) in the American Revolution, at the time he captured the British sloop *Serapis,* on Sept. 23, 1779. He had collected a number of vessels and was sent to the coast of Scotland, where he captured many prizes. Late in September he attacked the *Serapis* under Captain Pearson. Sailing broadside of that vessel, and after lashing the two boats together, a terrific hand-to-hand fight ensued. The British ship surrendered after a fight of three hours, but the *Richard* was damaged and sent to the bottom of the North Sea. For this victory Congress gave Jones the thanks of the nation and a gold medal.

BONIFACE (bŏn′ĭ-fās), the name of nine popes, of whom only three are celebrated in history.—Boniface I., who reigned in 418-22, was the earliest to assume the title of first bishop of Christendom.—Boniface VIII., who reigned in 1294-1303, was noted for the distinguished pomp displayed in the inauguration, in which the kings of Sicily and Hungary served him at table with their crowns upon their heads. He became obnoxious by interfering in many of the temporal affairs of Europe and was made a prisoner by Philip of France for taking part in the disputes between that country and England. He was assigned an unenviable place in Dante's "Inferno."—Boniface IX. reigned in 1389-1404. He was opposed by Benedict XIII., who was located at Avignon and claimed the papal dignity.

BONIFACE, Saint, the apostle of Germany, born at Crediton, England, in 680; slain by armed pagans in 755. He set out on a missionary expedition in 715 to operate in Friesland, but was frustrated by a war waged by Charles Martel against the Friesian king. Later he was given unlimited power to do missionary work by the Pope and attained great success in Hesse, Thuringia, and Friesland, where he converted thousands of heathen and baptized them into the Church of Rome. In 723 he was made bishop, and in 732 became archbishop and primate of all Germany. He founded churches, built convents, established bishoprics, and converted a pagan country into a Christian land. While in Friesland he was assailed by a mob and killed. His remains were buried at the abbey of Fulda, where a statue was erected to his honor in 1842. Both the Anglican and the Roman churches celebrate his festival on June 5th.

BONN (bŏn), an important city of Germany, in Rhenish Prussia, on the Rhine River, about fifteen miles southeast of Cologne. It is connected by railroads with all parts of Germany and carries on a large manufacturing and jobbing trade. The chief buildings include the railway station, the museum, the city hall, and the Münster Church, which dates from the 11th century and is in the Romanesque style. It is the seat of the famous University of Bonn (q. v.), in which Schlegel, Niebuhr, Brandis, and Ritschl were leaders in educational thought. The Beethoven House, in which the composer was born, now contains the Beethoven Museum. In its burial grounds are the graves of Schlegel and Schumann. Many tourists visit the city, being attracted by its pleasing villas and historical surroundings. Bonn was the seat of the electors of Cologne, and by the virtue of the Congress of Vienna it passed into the hands of Prussia in 1815. The city is beautifully improved with monuments, parks, electric railways, and waterworks, and is celebrated for its sanitary regulations. Population, 1905, 81,996; in 1920, 87,967.

BONN, University of, an institution of higher learning at Bonn, Germany, which ranks next to that of Berlin among the German educational institutions. The foundation was laid in 1777 by Maximilian Frederick, Archbishop of Cologne, who established an academy, but this was changed to a university in 1818 and removed to its present location in Bonn. The departments are law, medicine, philosophy, and theology. In its library are 280,000 volumes and many valuable manuscripts. The chief buildings include the university proper, and the laboratories, the observatory, and the physiological institute. Niebuhr, Arndt, and Schlegel were connected with this institution. The attendance 2,550, including a number of students from foreign countries.

BONNER (bŏn′nẽr), **Robert,** publisher, born near Londonderry, Ireland, April 28, 1824; died in New York, July 6, 1899. When young he came to the United States and learned the trade of a printer. He became proprietor of the New York *Ledger* in 1851. Several educational institutions received liberal donations from him, among them the College of New Jersey, at Princeton. He became an admirer of fine horses and was the owner of Dexter and Maud S.

BONY PIKE, a ganoid fish native to North America, found chiefly in the brackish waters of rivers and lakes. It is covered with hard, bony scales and the vertebrae are completely ossified. It breathes atmospheric air, coming to the surface for that purpose, and feeds on other fishes. Several species are found in Central America and the United States. These fish are interesting because they represent a fossil species and their type is almost extinct. The *gar pike* and the *alligator gar* belong to the same genus. The average length is three feet, but sometimes specimens six feet long are found.

BONYTHON, Sir John Langdon, journalist, born in London, England, Oct. 15, 1848. He studied at the Brougham School in Adelaide, Australia, and engaged on the literary staff of *The Adelaide Advertiser.* In 1887 he was president of the council of the

South Australian School of Mines and Industries, and subsequently held other positions in associations devoted to the promotion of commerce and industry. He was elected a member of the first Parliament of the Commonwealth of Australia for the State of South Australia in 1901, and was subsequently reëlected. His newspaper, *The Adelaide Advertiser,* of which he became editor and proprietor in 1898, has exercised a wide influence in promoting the interests of education and government of Australia.

BOOBY (bo͞o′bȳ), a swimming bird closely allied to the gannet, whose name was derived from its apparent stupidity. Audubon asserted that several specimens studied by him learned to be upon their guard and that they became difficult to approach after they had been harmed and frightened several days in succession, but usually this bird has neither fear nor apparent desire to flee from danger. It inhabits the eastern coast of North America as far north as Cape Hatteras. The nests are rudely constructed on rocky ledges, usually near the sea, and two or three eggs are laid at a time. While its flesh is not agreeable, it is sometimes eaten, though mostly by natives.

BOOK, the common name applied to a written or printed composition forming a single volume. The early writings were preserved largely on monuments, on the walls of buildings, and on ledges of stone. These were chosen because of their endurance against the corrosions of time. The Egyptians used the papyrus, a plant native to Egypt, to prepare writing material as early as 2000 B. C. It was prepared by cutting the stem of the plant into longitudinal slices, which were then pressed and gummed together. The Babylonians and Assyrians used either papyrus or preserved their writings on a kind of clay tablets that were hardened by baking. It is claimed that the Koran was written on the shoulder blades of sheep, and there are numerous instances in which pieces of beechen boards were used in making books. The early books made of papyrus and skins of animals were in the form of a roll, written on both sides, and when used in study or for reference were wound back and forth. In Ezekiel ii, 9-10, reference is made to this form in these words: "Lo, a roll of a book was therein; and he spread it before me; and it was written within and without." Books made in this form and transcribed by hand were very expensive. Plato paid $1,560 for a book; Aristotle, $2,900 for another; and Alfred the Great, about the year 872, gave an estate for a single volume.

The invention of paper and the printing press greatly cheapened books, but enormous prices are still paid for rare and copiously illustrated works. A copy of Machlin's Bible, illustrated by Tomkins, was valued at $2,625 when the first edition was published. Another Bible in fifty-four large folio volumes with 7,000 illustrations, some of them hand-drawn, was sold for $25,000. Formerly the size of a book was taken from the number of leaves it contained. A fine example of this is found in the library of the University of Göttingen, which contains a Bible that has 5,373 leaves. The leaves were represented in number by the folio, quarto, and octavo, and the page by the size of the paper, designated as royal, demy, or crown. Now the size of the page depends upon the number of leaves into which the sheet of paper that enters the book is folded. However, to express the size definitely, it is necessary that the size of the sheet be given in inches. A sheet of paper folded once, such as makes two leaves and four pages, is called a folio; folded twice, making eight pages, is called a quarto; folded three times, making sixteen pages, an octavo. The common sizes used are 8vo for large books and 12mo and 16mo for ordinary sizes. Folio and quarto books are rare, owing to their size being too large and difficult to handle. Illustrations have been used in books from an early date. The books now commonly sold in the market contain illustrations of the two kinds known as half tones and zinc etchings, these having largely superseded the wood engravings used early in the printer's art, and the finer and more expensive steel engravings of recent times.

When the Alexandrian Library became generally known, a market for books originated, and since that time the bookstore has been a common institution. The book trade is now one of the most important industries, employing large numbers of men and women and involving investments of enormous sums of money. When papyrus and parchments constituted the books in use, the printer's ink of the present time was unknown, but instead vegetable inks were made. Others were secured from animals, especially from the cuttlefish. These were applied to the permanent material, after the writing had been temporarily placed on the leaves of the palm and the inner bark of the elm, ash, and maple, which were used instead of tablets. When the manuscript writing was completed, it was coated over with a durable and transparent varnish. This served to protect the writings, whether on vellum, parchment, or any other material used in writing.

The subject-matter of a book is called the *text.* It is preceded by the *title page,* on which are the title of the contents, the name of the author and publisher, the date of publication, and sometimes the notice of copyright, but the last mentioned usually follows the title page. The *preface* is a statement of the author or editor in chief, explaining the plan and scope, after which is the *table of contents* and the *text.* Some books have an index, which may either precede or follow the text. A collection of books constitutes a *library*.

BOOKBINDING, the art of stitching or fastening together the leaves of a book for convenient use and covering them with a suitable cover. When books were rare and costly because of great patience and time required for writing them, the binding was done and the covers decorated on the most elaborate plans obtainable. The type-setting machines and high-speed printing presses are modern, but even with the invention of rude printing in the first half of the 15th century the production and cost of books were revolutionized. To prepare a page in type form and take off impression after impression was a vast improvement over the slow work of the Egyptian vassal and the Roman slave, who were employed to do much of the copying in ancient Egypt and Rome. In those early ages the books in common use were inclosed in a binding of boards with corners plated and sides clasped. The books of the wealthy and noble were encased with ivory, embellished with gold, and ornamented with costly gems. Not only were the bindings elaborate, but the title pages were very costly. The rolls included in the writings on scrolls were richly carved and finished in ivory and costly gems.

Binding has become a separate industry in the larger cities, and in many instances it is entirely apart from the printing institutions. The printed pages are sent to the binder, where much of the folding and other essentials in binding are done by machinery. The chief processes in binding are the following: Folding the printed sheets; gathering them in consecutive order; pressing them to secure compactness; setting the back for cords and sewing them; rounding the back edges and applying glue; trimming the edges; binding the book to the sides in the binding material, whether paper, cloth, or leather; lettering back and sides; and completing edges by gilding or otherwise. Books may be *full, half,* or *quarter* bound. A full-bound book is with the back and sides leather; half-bound is with the back and corners leather, and the sides cloth or paper; and quarter-bound is with the back leather and the sides cloth or paper. Many books are bound entirely in paper, cloth, and cloth-vellum. Books of law and medicine are bound largely in sheepskin, and the finer library books are in calf, morocco, or russia.

BOOKKEEPING, a system of recording the mercantile or pecuniary transactions so as to exhibit the condition and progress of business in a plain and comprehensive manner. It is an important branch of instruction in all commercial schools and business colleges and is studied by both sexes. Bookkeeping is taught in many institutions in connection with arithmetic and penmanship, and quite uniformly enters into the course of study in the evening schools of the larger cities of Canada and the United States. The institutions which teach it regularly conduct exercises that nearly approximate the operations of actual business. Thus, students carry on business correspondence, make and receive formal consignments of merchandise, buy and sell exchanges upon the different sections of the country, and become quite well informed in the business methods of banking. The functions of students are changed from time to time, hence they take the place of the shipper for a brief time, later that of a bookkeeper, afterward that of a collector, etc., and in this way learn to transact the business in various lines of trade and industry.

Bookkeeping as now taught is of two kinds, *single entry* and *double entry.* The terms *debit* and *credit,* meaning debtor and creditor, usually marked Dr. and Cr., are employed arbitrarily. The books used include a *daybook*, a *journal,* and a *ledger.* In the daybook are entered the transactions on the date and in the order of their occurrence, while the ledger contains the accounts. The journal is used to separate each transaction so as to simplify its transfer to the ledger. On the left-hand side of the ledger are the items of debit, as cash received, and on the right-hand side are the items of cash disbursed, and the difference is known as the *balance.* A payment in cash is called a *liquidation.* When the items are transferred from the journal to the ledger, they are said to be *posted.* An examination to verify the two columns of an account is known as taking a *trial balance.* In a large business establishment, where the double entry system is used, several account books are employed to permit checking different phases or departments with the view of knowing the condition of each. Such books include the *bill book, stock book, invoice book, cashbook,* and *account sales book.*

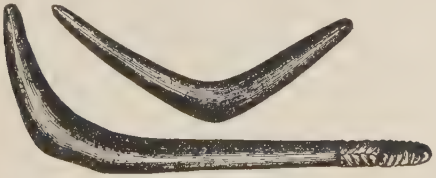
Single entry bookkeeping involves less labor than double entry, but does not provide the same degree of safety against errors. Accounts are usually kept in two records, the daybook and the ledger. The customer is charged on the debit side with debts he is to pay, and is credited on the credit side with cash or merchandise he may turn in for value received. To find the balance, the sum of the credits are compared with the sum of the debits. Double entry requires that a much more complete record be kept, and under this system every transaction is entered in two places, in a debit and a credit column. In this system a daybook, a journal, and a ledger are used. The transactions are entered in the daybook the same as in single entry, but from it they are transferred to the journal, classified according to the names or titles of the ledger account, and afterward are posted in the ledger.

BOOK OF MORMON, the book held sacred by the Mormons and by them regarded as a part of the Holy Scriptures. It assumes to contain a record of a chosen people in America, from the confusion of tongues at Babel until the time of Maroni, the last survivor of his race, who is thought to have died about 420 A. D. See **Mormons.**

BOOKPLATE, the name of a label used to indicate the ownership of a book or its place in a library. In recent years many wealthy persons have collected these plates and much has been written in current literature in regard to the different styles used by various persons and organizations. It is thought the first bookplates were made in Germany, whence they were taken to England, and subsequently brought from that country to America. They were plain and rude until about 1516, when Albrecht Dürer began to design and engrave many artistic forms. Others of much beauty are those made by Hans Holbein and Jost Amman, who gave special attention to selecting quotations from the classics, which were engraved in artistic forms and accompanied with the name and coat of arms of the owner. The best known designs of England are those in the Chippendale style, characterized by graceful effects instead of the somber designs, and in them were introduced pictures of flowers, fruit, landscapes and human figures. Many of these plates have been commanding high prices and are listed by sellers of old and rare books.

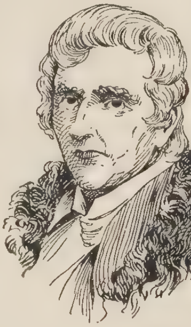
BOOM (bo͞om), a word frequently used to denote rapid development in a particular industry or locality. When shares in business enterprises are increasing in value, or the development of a city or state is progressing rapidly, it is said they are *on a boom.*

BOOMERANG (bo͞om′ĕr-ăng), a missile weapon invented and used by the natives of Australia. It is made of a curved stick, flat on one end and round on the other, about two feet long, two inches wide, and half an inch thick, and rounded at the ends. The savages grasp it at one end and throw it upward or forward. When thrown forward it has a skipping motion until it strikes the object aimed at or falls to the ground. When thrown upward, it slowly ascends and in its backward flight falls to the ground behind the thrower, near its starting point. It is a powerful weapon in war and in the pursuit of wild game. A similar missile was used by the Assyrians and Egyptians.


BOOMERANGS.

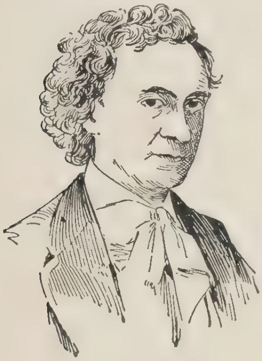
BOONE (bo͞on), a city of Iowa, county seat of Boone County, forty-two miles northwest of Des Moines, on the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and other railroads. The chief buildings include the post office, the Eastern Star Home, the Eleanor Moore Hospital, the high school, the Ericson Library, and the county buildings. About two miles west of the city the Des Moines River is crossed by the famous Boone viaduct, the highest double-track railroad viaduct in the world, 185 feet above low-water mark. In the vicinity are extensive deposits of coal and fire and pottery clay. Among the industries are brick-making, railroad machine shops, coal mining, an artificial ice plant, and grain and live stock shipping. The city has systems of gas and electric lighting, waterworks, sewerage, pavements, and electric urban and interurban railways. It was incorporated as the town of Montana in 1866, but the name was changed to Boone two years later, when it became a city. In 1887 the town of Boonsboro was annexed. Population, 1925, 12,663.

BOONE, Daniel, hunter and pioneer, born in Bucks County, Pennsylvania, Feb. 11, 1735; died in Charette, Mo., Sept. 26, 1820. In 1748 he came to Holman's Ford, S. C., where he became inspired by accounts of pioneer life, and in 1767 started with a party of six to explore the wilds of Kentucky. He was twice taken prisoner by the Indians, but escaped and returned to his home in 1771. Two years later he started with six families and made a settlement at Boonesborough, on the Kentucky River, where he built a fort. Soon after he was taken captive by the Indians and carried to Detroit, where he was adopted by a Shawnee chief. Learning that the Indians were planning an attack on Boonesborough, he escaped and reached that place in about four days, in ample time to warn his comrades and repel the attack. Soon after he was given a major's commission from Virginia and later became lieutenant colonel. In 1780 he brought his family back to Kentucky, and later successfully led a force against 400 Indians at Blue Lick. He moved to Missouri in 1795, where the government of Spain granted him 8,000 acres of land, the title to which he lost when the territory was acquired by the United States. However, Congress confirmed his title to 850 acres in consideration of valuable services. Enoch Boone, his son, was the first white child born in Kentucky. His life was written by John Filson (1784), and repub-


DANIEL BOONE.

lished in Finley's "Description of the Western Territory." The remains of Boone and his wife were removed to the Frankfort cemetery in 1845.

BOOTH (bōōth), a stall or tent erected at fairs. In early times trade in Europe was carried on chiefly by fairs. The huts or temporary movable structures in which the traders exposed their goods for sale were called booths. The term is also applied to the stalls or apartments used by voters in the Australian voting system.



EDWIN THOMAS BOOTH.

BOOTH, Edwin Thomas, son of Junius Brutus Booth, celebrated actor, born at Belair, Md., Nov. 13, 1833; died in New York City, June 7, 1893. He was educated for the stage by his father, and appeared in regular performance for the first time at Boston in 1849. During his father's illness in 1851 he played the part assigned the former in *Richard III.* The next year he traveled through Australia and the Sandwich Islands, returning by the way of California to the eastern states. He played *Hamlet* one hundred nights consecutively, and in 1862 was manager of the Winter Garden Theater, New York, where he brought out with much success many Shakespearian plays. He was manager of the Booth Theater, costing a million dollars, which did not prove a financial success. Such noted professionals as Cushman, Davenport, Wallack, and Modjeska appeared in his theater. Later he made trips through Germany and England and visited professionally the principal cities of the United States. His name became as inseparably associated with *Hamlet* as his father's was with *Richard III.* His skill and brilliancy were remarkable and he showed a refinement in interpretation and depth of feeling never before attained in Shakespearian plays.

BOOTH, John Wilkes, actor and assassin of President Lincoln, brother of Edwin Thomas Booth, born in Hartford County, Maryland, in 1838. As an actor he never became celebrated owing to a touch of insanity inherited from his father, and he was nervous and erratic. He was an ardent supporter of the institution of Negro slavery, and while playing at Ford's Theater, Washington, on April 15, 1865, shot President Lincoln, who occupied a private box. In an attempt to escape he broke a leg, but passed through a back door and mounted a horse held in waiting, on which he fled to Virginia. He was concealed in a barn near Bowling Green, Va., where he resisted arrest and was shot by Sergeant Boston Corbett, April 26, 1865.

BOOTH, Junius Brutus, celebrated tragedian, born in London, England, May 1, 1796; died on a steamboat on the Mississippi River, Dec. 1, 1852. He was the son of an attorney and secured a good education in various departments of art. Contrary to his fathers wishes, he appeared on the stage in Peckham, and in 1814 traveled with an English company through Holland and Belgium. In 1817 he played *Richard III.* at London with much success. In 1821 he came to America and appeared at the Richmond Theater, Virginia, which was followed by other engagements. He visited London in 1825 but returned to America two years later and opened the Park Theater in New York. He purchased a tract of land about twenty-five miles from Baltimore on which he made his home a large portion of the time. In 1852 he went to California, and traveled through the Southern States, giving entertainments, but became sick while on his way home and died en route.

BOOTH, Maud Ballington, reformer and author, born in London, England, in 1865. Her father, Mr. Charlesworth, a wealthy clergyman, became interested in the work of the Salvation Army. In 1884 she joined Catherine Booth in organizing an Army in Paris and later did similar work in Switzerland. She married Ballington Booth in 1897, and subsequently they seceded from the Salvation Army and established the Volunteers of America. She has been eminently successful in promoting organization work and in advocating reforms by lecturing and writing. She published "Look Up and Hope," "Sleepy Time Stories," "Lights of Childland," "After Prison—What?" and "The Curse of Septic Soul Treatment."

BOOTH, William, organizer and commander of the Salvation Army, born at Nottingham, England, April 10, 1829. He received an education by private tutors at his home and was ordained as a minister of the Methodist New Connection in 1850. Eleven years later he resolved to sever all denominational connection and devote himself entirely to evangelistic services. He married Catherine Mumford in 1855, to whom much credit is given for the success of his enterprises. Booth organized the Salvation Army in 1878, which since has spread generally to all Christian countries and has become a powerful agency in religious work. The strong element in the growth of the organization is that every convert receives an appointment to do some work in the plan of conversion. General Booth visited the degraded and destitute portions of London and other cities, in which the poorer classes were attracted to the services and interested in reformation. In 1880 the *War Cry,* a weekly publication, was established and is now widely circulated. Booth published his famous work, "Darkest England"

and the Way Out," in 1890. The American division was under the command of Ballington Booth until 1896, when he organized the American Volunteers with headquarters in New York City. The American division was visited three times by General Booth, and is still the strongest organization of this character in the Western Continent. He died Aug. 20, 1912.

BOOTHBY (bōōth'bĭ), **Guy Newell,** novelist, born at Adelaide, South Australia, Oct. 13, 1867. He studied in his native city and in England, and subsequently made extensive tours of Asia and Australia. His writings are based largely upon adventures and have been widely read in Great Britain, including Canada, and in the United States. Among the books are "Across the World for a Wife," "A Sailor's Bride," "Pharos the Egyptian," "Love Made Manifest," "Long Live the King," "Billy Binks, Hero, and Other Stories," and "The Viceroy's Protégé."

BOOTHIA FELIX (bōō'thĭ-ȧ fē'lĭx), a peninsula of North America, the most northerly point of that continent, located between Boothia Gulf and McClintock Channel. Its length from north to south is 150 miles and the width is fifty miles. Bellot Strait, on the north, separates it from North Somerset Island, and in the south it contracts to a narrow isthmus, which connects it with the mainland. Sir John Ross discovered it in 1829 and named it after Sir Felix Booth, who had contributed to the expedition. The northern magnetic pole was located on this peninsula in 1831, near the west coast and not far from Cape Adelaide.

BOOTH-TUCKER (tŭck'ẽr), **Emma Moss,** officer in the Salvation Army, born in Gateshead, England, Jan. 8, 1860; died Oct. 28, 1903. She was a daughter of William Booth, general of the Salvation Army, and the wife of Commander Booth-Tucker. In 1880-88 she had charge of the international training homes of the Army and long held the rank of consul, in which latter position she had joint jurisdiction with her husband in the United States. Her death resulted from a railroad accident.

BOOTLE (bōō't'l), a city of England, in Lancashire, on the Mersey River. It has transportation facilities by the Leeds-Liverpool Canal and several railroads, and is a manufacturing center of flour, clothing, and machinery. Many business men of Liverpool, near which it is located, reside in Bootle. Its institutions include a gymnasium, a public library, a museum, and a technical school. Population, 1907, 67,114; in 1921, 69,881.

BOOTS, the articles of dress worn to protect the feet and lower legs. They are a variety of *shoes,* but differ from them in that they extend higher up the leg, sometimes above the knee. They were developed from the *sandal,* which is the simplest and oldest kind of foot protector, and are used more commonly by men than by women. The boot was worn by the Greeks and Romans, who made ornamental designs, both on the part covering the foot and the portion extending above the ankle. In Greece buckskin was used in making the principal upper parts, and the soles were heavy so as to apparently increase the stature of the wearer. An elaborately adorned boot with wide tops came into general use in continental Europe in the 14th century, and subsequently the matter of regulating the styles was a subject for legislation by various governments.

The introduction of machinery in the manufacture of all classes of boots and shoes has greatly revolutionized the trade in these articles. A combined lasting and sole-nailing machine was invented in 1810 and soon began to be used with marked success in England and America. It was followed by the discovery that wooden pegs can be utilized in fastening the uppers and soles together, which was the common method until 1860, when the McKay sewing machine came into general use for this purpose. Another important invention is the Goodyear machine, which fastens the uppers and soles together by means of a welt. Later screw-wire machines, heeling machines, and other inventions followed, enabling the work of cutting, sewing, trimming, and polishing to be done almost entirely by machine labor. Now the work is greatly diversified, each part being done by different workmen on machines designed specially for particular purposes. The facility with which boots and shoes of all kinds are made has been demonstrated many times at the great expositions, where exhibits of the complete routine of work were made and the machines exhibited in their working capacity. See **Shoes.**

BORAH, William Edgar, statesman, born at Fairfield, Illinois, June 29, 1865. He studied in Illinois and at the University of Kansas, was admitted to the bar in 1889, and in 1891 removed to Boise, Idaho, where he practiced law. In 1903 he was elected United States Senator as a Republican, and was re-elected successively. He was an active opponent of the League of Nations, supported the Washington Arms Conference, favored early recognition of Russia, and supported an active financial reconstruction policy for Europe. Senator Borah is classed as an independent-Republican.

BORAX (bō'răcks), a crystalline salt found native in certain mineral springs and on the shores of many lakes. The chief supply is derived from Tibet, Peru, Chile, Tuscany, Germany, and several sections of North America, especially Nevada and California. It is prepared for commerce by washing the tincal, the crude material, with a solution of sodium hydroxide, and after dissolving in water it is treated with caustic alkali, after which the solution is evaporated and the borax crystallizes in six-sided prisms. The treatment varies somewhat with the condition in which the deposits are found. At Alameda, Cal., are refineries which treat the product secured from Clear Lake and other localities. There the crude material is dissolved in water and then treated with sodium carbonate, and the resulting solution is cooled in tanks, in which the borax forms on steel rods. Borax is used chiefly in soldering metals, glazing pottery and chinaware, preserving milk and meat, treating ulcers and skin diseases, and loosening dirt, and as an antiseptic and disinfectant.

BORCHGREVINK (bŏrk′grē-vĭnk), **Carsten Egeberg,** scientist and explorer, born at Christiania, Norway, in 1864. After studying in his native city and at the Royal Saxon School of Forestry, he emigrated to Australia, where he was surveyor and later instructor of languages at Cooerwell College in New South Wales. In 1895 he accompanied the whaler *Antarctic* upon an exploration of the south polar seas. He made a second exploring trip in 1898, when he sailed from London in the *Southern Cross,* landing at Camp Adare, South Victoria Land, on Sept. 17, 1899, where he spent nearly a year in making investigations and exploring the surrounding regions. The following year he returned to New Zealand. In this tour of exploration he found a new island, Duke of York, situated in Robertson Bay, and discovered the south magnetic pole to be located at about 73° 20′ south. By making a tour with sledges he reached latitude 78° 50′, which is the extreme point south visited up to this time by explorers.

BORDEAUX (bôr-dō′), an important city in France, capital of the department of Gironde, on the Garonne River, about sixty miles from its mouth, but accessible by all vessels. It has railroad connection with the leading cities of France, electric urban and interurban railways, and finely paved streets and public drives. Shipbuilding is an extensive enterprise. In the Roman period it was known as Burdigala, when it ranked as a commercial emporium. It was taken by Charles Martel in 735, captured by the Normans in the 9th century, transferred to the English crown in 1152, and restored to France in 1451. In the latter part of the war of 1870-71 it was the seat of the French general assembly, which had been driven there by the German army of invasion. At present it has a large commercial trade. Population, 1921, 261,678.

BORDEN (bôr′den), **Gail,** inventor, born at Norwich, N. Y., Nov. 16, 1801; died Jan. 11, 1874. He removed to Covington, Ky., when a youth, taught school in Mississippi in 1822, and subsequently became a surveyor. While on a surveying expedition he conceived the idea of making food suitable for emigrants and became the originator of *pemmican,* a kind of meat biscuit now used in polar expeditions. In 1856 he was granted a patent for his method of condensing milk. Afterward he took up the manufacture of condensed fruit juices and beef extract. He established milk-condensing plants at Elgin, Ill., and Brewster's Station, N. Y.

BORDEN, Robert Laird, statesman, born at Grand Pré, Nova Scotia, June 26, 1854. He studied at Acacia Villa Academy in Horton, was called to the bar in 1878, and built up an extensive practice in the supreme courts of Nova Scotia and Canada. In 1896 he was elected to the House of Commons and in 1901, upon the resignation of Sir Charles Tupper, became the leader of the Conservative party in the House of Commons. He was defeated for reëlection for Halifax in 1904, but was returned for Carleton, Ont. In 1911 he was in opposition to reciprocity with the United States and became Premier, succeeding Sir Wilfrid Laurier, whose party was defeated. He was knighted in 1914 for efficient service.

BORDENTOWN, a city of New Jersey, in Burlington County, six miles southeast of Trenton, on the Pennsylvania Railroad. It is on the Delaware River and the Delaware and Raritan Canal and is important as a manufacturing point for the production of worsted goods, ironware, machinery, and clothing. Its public institutions include a convent, a school for girls, and the Bordentown Military Institute. The city was incorporated in 1849. Near it is "Ironsides," the home of Charles Stewart, and a number of fine estates, including the former residence of Joseph Bonaparte. Population, 1900, 4,110; in 1920, 4,371.

BORDER, The, the territory lying immediately on both sides of the frontier between England and Scotland. The region is noted for many historical battles and invasions important in the history of the Scotch and English. Among the noted forays of the Border is the Chevy Chase (q. v.). The writings of Sir Walter Scott commemorate Border warfare.

BORE, or **Eagre,** a tidal phenomenon at the mouths of certain rivers. Bores are common to rivers that gradually expand toward a wide mouth, and in which high tides occur. The spring flood tides drive great quantities of water from the sea into the river and form a kind of watery ridge, which rushes upward with great violence. The most celebrated bores are those of the Indus, Ganges, and Brahmaputra, of Asia, but the phenomenon is observable in other streams. In one of the branches of the Ganges the bore travels seventy miles in four hours, sometimes forming a wall of water ten feet high. In the Amazon it rises from ten to twelve feet. The bore of the Petitcodiac River extends from the Bay of Fundy to Moncton, N. B., about 95 miles.

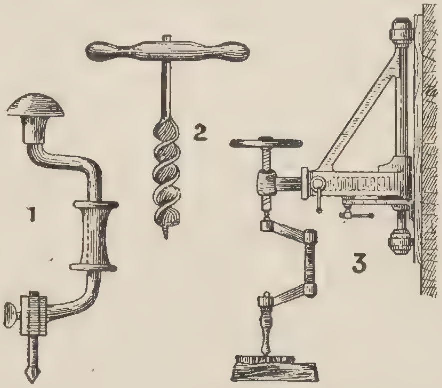
BORGHESE (bôr-gâ′sâ), **Camillo, Prince,** soldier, born in Rome, Italy, July 19, 1785; died April 9, 1832. He served in the French army after the invasion of Italy and in 1803 married Pauline, a sister of Napoleon, who created him Duke of Guastalla and made him governor general of the provinces beyond the Alps. He sold the Borghese collection of antiquities and artistic treasures, which had been gathered by his father, to Napoleon, who removed them to France, but they were restored to him after the fall of the emperor. These treasures are now in the Borghese Palace, a fine structure in the villa Borghese, at Rome. The government of Italy purchased the villa and the Casino, in which the treasures are stored, and the public has access to the place, which contains many valuable sculptures and paintings.

BORGIA (bôr′jȧ), **Cesare,** son of Pope Alexander VI., born in Italy in 1476; killed March 12, 1507. At the age of seventeen he was raised to the rank of cardinal and soon after made captain general. In 1499 he married Charlotte, daughter of Jean d'Albert, King of Navarre, and soon after accompanied Louis XII. to Italy, where he undertook the conquest of the Romagna for the Pope. In his warfare he showed great cruelty by murdering those who stood in his path to promotion. His cruelty and oppression caused him to become infamous. He was made Duke of Romagna by his father, but was deposed at the death of the latter and afterward was killed. Though base and cruel, he patronized learning and possessed a persuasive eloquence.

BORGIA, Lucretia, daughter of Pope Alexander VI., sister of Cesare Borgia, born at Rome in 1480; died June 24, 1519. She was married to Giovanni Sforza, Lord of Pesaro, in 1493, but the marriage was dissolved by her father four years later, and she was given as wife to Alphonso, son of Alphonso II., King of Naples. Her second husband was assassinated two years after and she was married to Alphonso d'Este, son of the Duke of Ferrara. Some writers have accused her of many crimes, though, perhaps, many accusations are unjust. She was a patron of music and learning, and was celebrated as a lover of good literature.

BORIC ACID (bō′rĭk), a compound of boron, oxygen, and hydrogen. It is found native in Tuscany, the Lipari Islands, California, and elsewhere. The first discovery of this substance was made in 1777 in the lagoons of Tuscan, which are still the principal source of supply. Several lakes in California and Nevada yield borax in combination with various elements. It is derived from hot vapors which come naturally from thermal lakes and springs, and these vapors, which are largely boric acid, are absorbed by being passed through water. The acid turns blue litmus purple. It is used chiefly in the manufacturing of borax, in glazing porcelain, and in preparing certain pigments.

BORING MACHINE, a mechanical device used in boring holes in wood, rock, and metals. The *auger* (q. v.) is a simple tool for making holes in wood, while the *gimlet* and *awl* are used where smaller opening are required. *Drills* are used in piercing stone and metal. The *diamond drill,* constructed of a hollow tube with diamond cutters at one end, is the most effective in boring rock. The larger boring machines are operated by steam or compressed air. They do the work quickly and without danger of loss from obstructions that usually prevent the lighter apparatus from cutting through to the depths desired. Boring machines intended to be operated by hand usually have a metallic framework mounted on a wooden base, and the bit is turned by means of a handle or brace acting upon small cogwheels, one of which turns horizontally with the bit or auger.



1, Brace with bit; 2, auger; 3, adjustable bitstock.

BORNEO (bôr′nē-ō), one of the largest islands of the world, located in the center of the East Indies. It has an area of 290,000 square miles. A large number of small islands are located near the coast, of which Labuan, off the coast of Brunei, is the most important. Darwin considered Borneo and the East Indies to be the elevated portions of a vast continent submerged in the Pacific, which is probable. The surface is mountainous, attaining its culminating summit in Mount Kini Balu, in the northern part, which has a height of 13,690 feet. While the island has no active volcanoes, it is frequently subject to earthquakes, however, not of a serious nature. It is watered by numerous rivers, among them the Barram, Limbang, the Rejang, and the Batang Lupar. Many of the rivers are navigable and add largely to the transportation facilities of the island. The rivers and lakes are infested by crocodiles and various animals common to swampy and marshy districts. Other wild animals include the tapir, elephant, deer, leopard, rhinoceros, buffalo, many varieties of monkeys, and birds of song and fine plumage.

The productions of Borneo consist of sago, rice, tobacco, pepper, gambier, coffee, cotton, and many varieties of tropical fruits. The forests yield an abundance of excellent timber and edible birds' nests. It has extensive mineral deposits, including zinc, gold, quicksilver, tin, antimony, and diamonds. The manufactures are not extensive, the most important being cotton fabrics, utensils, matting, and fancy baskets. A large part of the interior is inhabited by the Dyaks, a native race mixed more or less with the Malays, and other races include the Chinese, Japanese, and Europeans. Mohammedan is the principal religion. The exports are large and greatly exceed the imports. General fertility of the soil, good climate in the larger portions, and growing European influence are collectively a potent factor in widening commerce and increasing wealth. Both the Dutch and British have constructed telephone, telegraph, and railroad lines to connect the interior parts with the coast.

The history of Borneo dates from 1578, when it was discovered by the Portuguese, but the first European settlement was not made until the seventeenth century, by the Dutch, who visited the island in 1598. British North Borneo includes the extreme northern peninsula of the island. It has an area of 31,106 square miles. The north central part is called Brunei, which consists of about 3,000 square miles, and is under the semi-independent government of a native sultan, who is subject to Great Britain. The capital of the state is Brunei, located on a river of the same name, and has a population of 10,500. To the south and west of Brunei is the English possession Sarawak, which has an area of 42,000 square miles, with the seat of local government at Sarawak, a city of about 18,000 inhabitants. The larger part of Borneo belongs to Holland. The Dutch possessions contain an area of 213,894 square miles. The region belonging to Holland is divided into two districts, that of the South and that of the East. Pontianak, population 9,500, is the capital of the former, and Banjermasin, 30,380, of the latter. British North Borneo has a population of 250,000; Brunei, 25,000; Sarawak, 500,000; and Dutch Boreno, 1,225,000.

BORNU (bôr-nōō'), a kingdom of Negroes, in the central part of the Sudan, Africa, with an area of 50,000 square miles. It extends southwest from Lake Tchad, which forms its northeastern limits. The two principal rivers are the Shari and Yeou, which flow into Lake Tchad from the west. The district is more or less included in the German possession of Kamerun and the British Niger Territories. It is exceedingly fertile and produces rice, indigo, cotton, tobacco, corn, cocoa, palm oil, ivory, and fruits for export. Domestic animals, including horses, cattle, sheep, elephants, and buffaloes, are reared extensively. The religion is Mohammedan and the labor is largely based on a system of slavery. Kuka is the capital and chief trading point. It has a population of about 60,500. Other cities include Bundi, Yola, Birni, and Gummel. The army of the reigning sultan numbers about 30,000 men. Population, about 5,250,000.

BORODINO (bȧ-rȧ-dyĕ̂-nô'), a village of Russia, in the government of Moscow, on the Kologa River, a tributary of the Moskva. It is celebrated as the site of a battle on Sept. 7, 1812, between the Russians under Kutusoff and the French under Napoleon. The French army consisted of about 150,000 men and the Russian army was somewhat smaller, and the struggle was chiefly an attempt of the French to capture the lines of redoubts and press on to Moscow. Napoleon made three assaults and remained in the field, while the Russians retreated in good order, but Moscow was soon after occupied by the French. Both sides claimed the victory, but it was disastrous to the French in that the Russians burned Moscow and destroyed the stores. About 75,000 were killed and wounded in the Battle of Borodino, which is called the Battle of Moskva by the French, from the river of that name.

BORON (bō'rŏn), a chemical element discovered by Sir Humphry Davy in 1808. It is not found native, but occurs in combination with *borax, ulexite,* and *sassoline.* It fuses only at a very high heat and has a specific gravity of about 1.84. Its principal commercial use is in making boric acid and certain borates.

BORROMEAN ISLANDS (bôr-rȯ̂-mā'an), a group of four small islands in northern Italy. They are rocky and famed for their beauty. Isola Bella, the most celebrated of the group, has a beautiful palace of the Borromeo family, from whom they were named. Isola Madre, the largest island, has fine groves of orange trees and gardens of tropical flowers. These islands were improved in 1671 by Count Borromeo (1538-84), a celebrated Roman Catholic cardinal.

BOSNA-SERAI (bôs'nȧ-sĕr-ī'), or **Serajevo,** the capital of Bosnia, on the Miljacka River, 120 miles southwest of Belgrade. It has extensive railway facilities, potteries, dye works, machine shops, and silk-weaving establishments. In the vicinity are iron mines and mineral springs. The chief buildings are those erected by the government, including the governor's residence. Other buildings of note are the seminary, a Catholic cathedral, and the mosque of Husref Bey. Many fine bazaars are maintained and the trade is important, owing to its location between Turkey and Austria-Hungary. Population, 1920, 59,875.

BOSNIA (bŏz'nĭ-ä), a province of Austria-Hungary, transferred with Herzegovina and Novibazar from Turkey by the Treaty of Berlin in 1878. The area, including Herzegovina and Novibazar, is 19,702 square miles. In Bosnia the surface is mountainous, including ranges of the Dinaric Alps, but toward the south, in Herzegovina, it is level or gently undulating. A large part is fertile and well adapted to agriculture. It is well watered by the Bosna, Save, Drina, and Verbas rivers and is rich in forests and minerals. The products are wheat, barley, tobacco, hemp, rye, buckwheat, and domestic animals. Copper, iron, antimony, chromium, and salt are mined profitably. It has manufactures of sugar, matches, chemicals, woolen and cotton goods, iron products, firearms, machinery, leather, and dairy products. Bosna-Serai (q. v.), or Serajevo, is the capital and largest city. The principal cities, besides the capital, are Mostar, population 15,500, and Banjaluka, 14,380. The district is well traversed by telephone, railway, and telegraph lines. For the purpose of government (Landesregierung) it is divided into four departments and these are subdivided into six district (Kreis) and fifty-four county (Bezirk) authorities. The chief religious affiliations are with the Mohammedan, Greek Catholic, Roman Catholic, and Jewish faiths. A Servian dialect is spoken chiefly, but German is the official language and is taught in the schools. The territory included in the province was a part of Dalmatia and Pannonia in the time of the Romans. It belonged to Turkey from 1463 until it was given to Austria-Hungary in 1878. Francis Joseph annexed it in 1908 by proclamation and it is now a possession of Jugo Slavia. Population, 1921, 1,998,375.

BOSPORUS (bŏs′pō-rŭs), a strait connecting the Black Sea with the Sea of Marmora, and separating Europe from Asia. It was so named because, according to legend, Io was transformed into a cow and swam across it. It is about nineteen miles long, 190 feet deep, and from one-third to two miles wide. To distinguish it from the *Cimmerian Bosporus*, which is between the Black Sea and the Sea of Azov, it is properly called the *Thracian Bosporus*. It is under the control of Turkey and is defended by a series of forts. On its shores are many lighthouses, especially at its northern and southern ends, and it is improved for extensive commercial activity. In ancient times the kingdom of Bosporus was located on both sides of the strait. It was founded in 502 B. C., became tributary to the Scythians in 290, and was vanquished by Pontus in 116. The region was long under Roman dominion, when it formed a part of the Eastern Empire.

BOSSUET (bō-sü-â′), **Jacques Bénigne**, pulpit orator, born in Dijon, France, Sept. 27, 1627; died April 12, 1704. He studied philosophy and theology at the College of Navarre, Paris, and was ordained a priest in 1652. The same year he was made canon of Metz, where he became renowned as a pulpit orator, and subsequently preached in Paris, where he delivered a number of sermons in the presence of Louis XIV. In 1669 he was made Bishop of Condon, the following year became tutor to the dauphin, and subsequently was Bishop of Meaux. He became noted as a controversialist by his controversy with Fénelon (q. v.), in which he was supported by the Pope, and favored the revocation of the Edict of Nantes. His chief writings include "Discourse on Universal History," "Funeral Orations," and "An Exposition of the Doctrines of the Catholic Church on Subjects of Controversy."

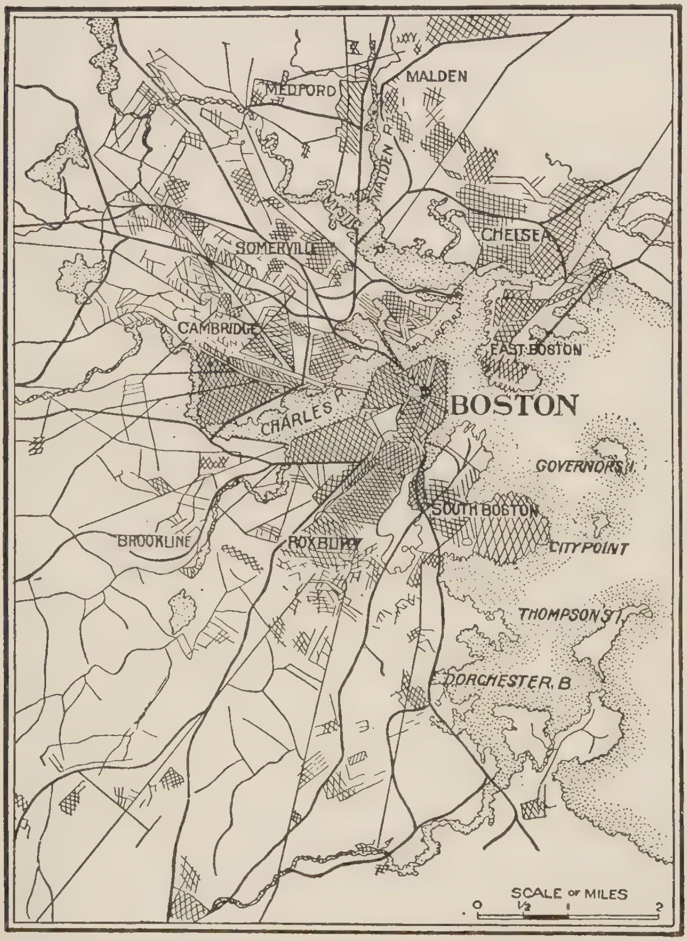
BOSTON (bôs′tŭn), the capital of Massachusetts, chief city of New England, and sixth in size of the American cities. It is located in Suffolk County, of which it is the county seat, on Boston Bay, and at the mouths of the Mystic and Charles rivers. It is 232 miles by railway northeast of New York, and is the focus of many steam railway and electric lines. The principal railroads include the Boston and Maine, the Boston and Albany, the Fitchburg, and the New York, New Haven and Hartford lines. On Boston Harbor, an arm of Massachusetts Bay, is the older part of the city, situated between it on the east and the Charles River on the west. Originally large tidal marshes occupied a considerable area along the shore, but these were filled in and many acres were added to the area of the city, for which purpose a number of elevated points, such as Beacon and Fort hills, were cut down.

The city has an area of about 47 square miles. This is made up of the original site and the additions annexed from time to time. East Boston, on Noddle's Island, was added before the Revolution; South Boston, annexed in 1804; Roxbury, in 1868; Dorchester, in 1870; and Brighton, Charlestown, and West Roxbury, in 1874. Practically all the streets are paved substantially, including pavements constructed of Belgian blocks, macadam, gravel, and asphaltum. Scollay Square is located near the center of the peninsula, between Boston Harbor and the Charles River, and from it radiate the streets in the compactly built business portion. Many of the streets do not extend uniformly with the cardinal points of the compass, but the main thoroughfares have a direction approximately north and south to a point nearly opposite Fort Point Channel, whence they turn to the southwest. State Street is the important financial center, corresponding to Wall Street in New York, and Tremont, Boylston, and Washington streets are among the business thoroughfares. Commonwealth Avenue, 240 feet wide, is one of the finest boulevards in America. The Fenway, Massachusetts Avenue, and the Strandway are boulevards of much beauty. Many cross streets facilitate intercommunication, and an efficient street railway system has lines extending to all parts of the city, except East Boston, which is connected by ferry. A subway and an elevated railway carry a large portion of the travel in the crowded part of the city.

Northwest of the peninsular, across Boston Harbor, is East Boston, connected by ferry with the main business section. Charlestown is located north of the peninsula and Cambridge is west, across the Charles River, and South Boston lies east of South Bay and Fort Point

Channel. The fashionable residential section is in the southwestern part, extending to Roxbury.

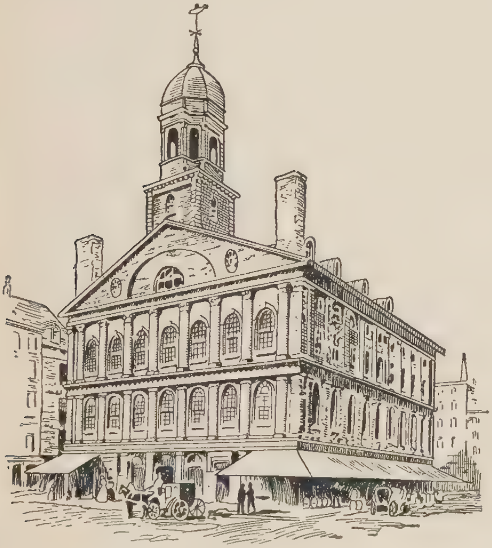
BUILDINGS. The architecture is generally substantial and commodious and the buildings include many of historical interest, both from the style of construction and their association with great events. On Beacon Hill is located the State House, built in 1795, and in its vicinity are statues of Daniel Webster and Horace Mann and Saint Gaudens' Shaw Monument. The city hall, on School Street, and the customhouse, on State Street, are fine structures, and near the former is the county courthouse, erected at a cost of $2,500,000. In the vicinity of Copley Square are many of the larger buildings, including the museum of fine arts, the public library, and the Second Unitarian Church. Here also is the New Old South Church, a fine Gothic architectural structure. The First Church of Christ (Scientist), the First Spiritual Temple, and the Roman Catholic Cathedral of the Holy Cross are among the finest ecclesiastical buildings. Boston has fully 300 churches, representing the leading Christian denominations, and its public library is the largest free circulation library in America.



Many of the office buildings, department stores, and public institutions are models of substantial construction and convenient architectural design. These include the Massachusetts General Hospital, the Chamber of Commerce, the Masonic Temple, the Sears and Ames building, the Tremont Temple, the Natural History Museum, the New England Conservatory of Music, and the Youth's Companion building. Boston has many theaters and other places of amusement, foremost among which is the Boston Theater. The Vendome and Touraine are residential hotels, and the Quincy, the Statler, the Adams, the Parker, the Bellevue, the Lenox, and the United States are among the larger commercial hotels.

Foremost among the historical buildings is the Christ Church, known as Old Church North, erected in 1723, in whose spire were hung the lanterns for Paul Revere. The Old State House, on Washington Street, at the head of State, dates from 1748. It was restored to its provincial appearance in 1882 and it contains a collection of interesting relics and paintings. King's Chapel, at the corner of School and Tremont streets, established in 1689 and rebuilt in 1754, was attended during the colonial period by the royal governors and has the oldest cemetery in Boston. At the corner of Milk and Washington streets is the Old South Meeting House, built in 1729. Other noteworthy structures are the Faneuil Hall, known as the "Cradle of Liberty," and the Old Corner Bookstore. Among the old cemeteries are Old Granary Burying Ground, containing the graves of Paul Revere and Samuel Adams; Central Burying Ground; and Copp's Hill Burial Ground, which contains the graves of Irving Cotton Mather and others of his family. King's Chapel Burying Ground contains the graves of John Winthrop and many early colonists.

PARKS. Foremost among the public grounds is The Common, one of the oldest and most interesting public parks in America. It is located in the heart of the city, containing 48 acres, and has been preserved for public use since 1674. The "Great Elm" stood near the center until 1876, when it was blown down, and at nearly the same place now stands the Soldiers' Monument, erected to the soldiers who fell for their country. The Boston Massacre is commemorated by the Crispus Attucks Monument, which stands near the Tremont Street Mall. The Public Garden, containing 24 acres, is near The Common, and in it are an artificial lake and statues of Washington, Charles Sumner, and Edward Everett. Commonwealth Avenue, the finest boulevard of Boston, extends from the Public Garden into the Back Bay district, which is famed for its beautiful lawns and fashionable buildings. Marine Park, which includes Castle Island, North End Park, at the northern extremity of the peninsula, and the beautiful park of "The Fens" district are other points of interest and beauty. In the Arnold Aboretum are all the shrubs and trees that can be grown in the climate of Massachusetts.



FANEUIL HALL.

Boston is noted for its many fine monuments, some of which have already been named in this article. Charlestown is the site of Bunker Hill monument (q. v.), a granite obelisk, and here also are a soldier's monument, a monument to John Howard, and statues of Colonel Prescott and General Warren. A statue of Beethoven is in the Music Hall; one of Governor Winthrop, in Scollay Square; one of Leif Ericson, in Commonwealth Avenue; one of Samuel Adams, in Adams Street; one of Admiral Farragut, in Marine Park; and one of Columbus, near the Roman Catholic cathedral.

INSTITUTIONS. Many educational and charitable institutions are maintained and liberally patronized. They embrace the Boston University, Massachusetts Normal Art School, Boston College, Massachusetts Institute of Technology, Perkins Institute, Tufts College Medical School, and the medical and dental schools of Harvard University. The Boston Latin School was founded in 1635. The Lowell School of Design, the New England Conservatory of Music, and a number of other institutions are centers of training in the arts. Besides the books and manuscripts in the Boston Public Library, which is one of the largest in the country, there are noted collections in the Boston Athaeneum, the Congregational Library, the American Academy of Arts and Sciences, the State Library, and the leading educational institutions. A large number of literary, historical, and scientific societies are maintained and much is done in the way of charity. Boston holds high rank in the maintenance of reformatories. The principal almshouses and penal institutions are on the islands in the harbor.

INDUSTRIES. Boston is preëminently a center of manufacturing, but many of the factories owned and operated by citizens are located in towns of the surrounding country. The extensive transportation facilities make it possible to reach these factories, and the products are handled largely through the business houses of the city. The census of 1923 places the value of the manufactured product within the city at over $583,600,000 per year.

The terminus of important railroads are located on a safe and commodius harbor. Boston is noted as the financial center of New England. Its foreign commerce ranks next to that of New York, and as a wool market it is exceeded only by London. The largest vessels enter its harbor, which is eight miles wide and sixteen miles long, and is protected by strong fortifications. Lighthouses and beacons are located on a number of the islands. The trade is handled at a system of freight terminals, where the railroads and ships come together, and the passenger traffic is cared for at two terminal stations, the South Station and the North Station. The export and import trade carries all articles of manufacture and production familiar to the American people, and the internal revenue collected annually is $8,500,000.

HISTORY. The history of Boston may be said to begin in 1626, when the first settlement was made on the peninsula, and a few years later a company of colonists removed from Charlestown to join the settlement. These included John Winthrop and a number of colonists brought by him to Salem. The place was first known as Trimontaine, but was renamed Boston in 1630, and two years later the first meeting house was built. It soon became the principal town and business center of the Massachusetts Bay Colony, and was the chief seat of Puritan learning and religious life. In the movement for American independence, it took a leading and aggressive part. Here occurred riots following the Stamp Act, the skirmishes at Charlestown, the Battle of Bunker Hill, the Boston Massacre, the Boston Tea Party, and many important events following the Battle of Lexington.

Its material growth in wealth and as a center of commerce dates since the Revolutionary War. In 1822, when it had a population of 47,000, it received its charter as a city. The *Brittania,* a Cunard liner, was the first steamer of that line to enter the harbor, in 1840. William Lloyd Garrison and others did much to promote sentiment in favor of the abolition of slavery, and the city was enthusiastic in its support of the Federal government during the Civil War. A destructive fire swept over it in 1872, when about fifty acres of its business section were laid waste. However, it was rebuilt to much better advantage and substantial modern structures replaced many of the older ones dating from colonial times. As a literary center it has taken a prominent place in learning and culture. In or near it lived Hancock, Motley, Thoreau, Lowell, Whittier, Longfellow, Prescott, Holmes, Parkman, and Emerson. The inhabitants are largely American, but include many Irish, Germans, English, and Italians. It is exceeded in population only by New York, Chicago, Philadelphia, Detroit, and Saint Louis. Population, 1900, 560,893; in 1925, 779,620.

BOSTON MASSACRE, an affray at Boston, Mass., on March 5, 1770, between seven British soldiers under Captain Preston and a mob of citizens. Several minor riots had taken place from time to time, owing to opposition by the people of Boston to the stationing of troops in the city. It took place on State Street, formerly King Street, where the soldiers were attacked with stones and other missiles. One of the soldiers who received a blow fired, and his companions, mistaking an order, followed in shooting at the mob. Three of the populace were killed and seven were wounded. The mob retreated and the bells of the city rang an alarm, causing several thousand people to gather, but no further hostilities took place. Several of the soldiers were tried on a charge of murder, but were acquitted. This affray did much to create a sentiment in favor of treating the colonists with consideration, and the garrison was removed to Castle Island.

BOSTON TEA PARTY, a popular name of an occurrence in Boston Harbor on Dec. 16, 1773. The American colonies had protested to Parliament against placing a tax on articles imported, and the American merchants entered into an agreement not to import from Great Britain while such tax was collected. However, that body declared their right to tax the colonists without their consent, and, when the English East India Company sent cargoes of tea to the port of Boston, the Americans resisted the collection of the duty. A conference was held in the Old South Meeting House, after which sixty men, disguised as Indians, boarded the vessels in the harbor and threw 342 chests of tea into the water. To retaliate, the government closed the port against all commerce and navigation.

BOSTON UNIVERSITY, an institution of higher learning at Boston, Mass. It was chartered in 1869 and is under the auspices of the Methodist Episcopal Church. The foundation was laid by Isaac Rich, Lee Claflin, and Jacob Sleeper, who gave their fortunes for that purpose. It offers both college and graduate courses, and has departments of liberal arts, agriculture, theology, law, and medicine. The post-graduate department is known as the School of All Sciences, which is affiliated with the University at Rome and the National University at Athens. Its agricultural department is at Amherst, Mass., known as the Massachusetts Agricultural College. The faculty consists of 500 professors and instructors, and the attendance is about 11,000 students. The endowments aggregate $3,500,000.

BOSWELL (bŏz′wĕl), **James,** friend and biographer of Samuel Johnson, born in Edinburgh, Scotland, Oct. 29, 1740; died June 19, 1795. He was the eldest son of Lord Auchinleck, studied at Edinburgh and Cambridge, and became a member of the Scottish bar. In 1763 he formed the acquaintance of Johnson, and later that of Pàoli, Rousseau, and Voltaire. He accompanied Johnson on a tour to the Hebrides and to Scotland, and wrote the "Life of Samuel Johnson," one of the most excellent biographies ever published. It appeared in 1791, and a second edition was issued two years later to supply the popular demand. His other writings include "Journal of a Tour to the Hebrides." Though noted as a writer, he did not build up an important law practice.

BOSWORTH (bŏz′wŏrth), a small town of Leicestershire, England, noted for the Battle of Bosworth Field, on Aug. 22, 1485. The battle was fought between Richard III. and the Earl of Richmond, afterward Henry VII. The former was deserted by his troops and rushed into the camp of the enemy, crying "Treason! treason!" and was slain. His death ended the Wars of the Roses. The town has a population of 1,150.

BOTANY (bŏt′ȧ-nȳ), the science that treats of plants—their structure, the functions of their parts, and the conditions governing their growth. It embraces a general description and classification of plants. The three kingdoms of nature are designated as *animal, vegetable,* and *mineral.* Life is a condition common to animals and plants, but the representative species of the two kingdoms are marked by a wide range of difference in form and structure. There are three main physical characteristics by which animals differ from plants. These consist in their food, the ability to move some or all of their parts, and the power of volition or will. Plants subsist on water, earth, and air, which they take in by their roots and leaves, while animals feed upon other animals and plants. The principal uses of plants are for animal food and protection, and to preserve the fertility of the soil and the purity of the atmosphere. The elements necessary for plant growth are light, heat, and moisture, and, since the requisite amount of these varies with different kinds of plants, we find in every climatic zone a flora peculiarly adapted to local conditions. Plants are propagated by seeds, spores, or particles of the main stock.

Botany treats of plants as wholes and also as consisting of various organs. The organs of vegetation are the *roots, stems,* and *leaves.* The roots grow downward and gather moisture and nutrition from the soil. They commonly divide into many small branches or fibers called *rootlets.* The part which grows upward and bears the leaves and blossoms is called the stem. It usually has many branches and branchlets, each having leaves in various proportions, but in some species the leaves are wanting. The leaves are green or brownish, and grow mostly from the upper part of the stem. They are of different forms and sizes, with one side toward the sky and the other toward the ground. The foliage of plants is constituted of leaves. Plants and their organs and functions are treated under plants, which see.

CLASSIFICATION. The classification is now based on the particular species of plants and their principal affinities. By *species* is meant an assemblage of individual plants having characteristics in common, coming from the same original stock, and having seeds or spores that produce similar individual plants. The view is held that species of the same kind may exhibit differences which are characteristic of distinct plants, but this is true only after long periods of time and under vastly different conditions. Study is now generally confined to the affinity of plants of the same and different regions; to the cells and tissues by means of the microscope; to the growth of new species from different kinds; and to the relation of plants to their environments. The four principal divisions of botany now are: Structural or morphological, dealing with plant-structure; physiological, treating of the function and vital actions of plants; descriptive or systematic, relating to classification and arrangement; and paleontological, treating of fossil plants. Phanerogamic botany treats of flowering plants, and cryptogamic botany, of flowerless plants. See **Plants.**

HISTORY. The study of botany is not as old as astronomy or geography, but some branches of it were taught as early as the time of King Solomon, who spoke of plants "from the cedar in Lebanon even to the hyssop that springeth out of the wall." The first work on botany dates from Theophrastus, a pupil of Aristotle, who lived in the 4th century B. C. His classification of plants is unsatisfactory, but he showed much greater skill in the description of plant organs than scholars who lived in the centuries immediately following his time. In the 1st century of the Christian era Diosconides, of Asia Minor, described about 600 plants in a work that was considered good authority until the revival of learning. About the same time Pliny the Elder described more than 1,000 species of plants. His work contains numerous errors and bears evidence of having been compiled from various sources, rather than written from personal investigation.

The Arabians gave much attention to this science in the 8th century, but material progress was not made until the 16th century, when Otto Brunfels, a German writer, published an extended work in two volumes with able descriptions and cuts, under the title "History of the Plants of Strasburg." Other German writers soon followed with publications, and the store of knowledge was largely extended through works in the Dutch, Italian, and French. Before the end of the century the principal universities of Europe established chairs of botany and organized botanical gardens. Many scholars traveled throughout the latter part of the 16th and 17th centuries for the study of plant life and structure in both hemispheres. The microscope opened a new epoch in the science about the middle of the 17th century and led to the study of minute portions and sap pressure, and brought vegetable philosophy forward as a very important branch of knowledge.

Linnaeus, a Swedish naturalist, prepared and published a classification of plants in 1735, which was speedily adopted in place of those formerly used and served the purpose of study for many years, although it has long since been displaced. It is based largely on the characteristics and the production of the flowers and the seed. In the 18th century scholars investigated large groups or families of plants, and added many valuable discoveries to the science. The system promulgated by Bernard Jussieu (1699-1777), a French scholar, is based on previous discoveries and natural affinities of plants. He devoted much time to the culture of plants in gardens, took personal observation of their growth, and lectured extensively in the leading universities of Europe. His system is now the basis of the classifications that are generally approved. The system is set forth in his "Elementary Principles of Botany," published in 1804. He taught the subject according to this classification at Montpelier as professor of botany and later at Geneva. Other writers contributed valuable publications and lectures on the subject; those of Darwin rank among the highest.

BOTANY BAY, an inlet five miles south of Sydney, on the east coast of Australia. It was discovered in 1770 by Captain Cook, and so named on account of the large number of formerly unknown plants found there. The first English penal colony was founded at Botany Bay in 1788, and later it was removed to Port Jackson, near the site of Sydney. It was long known as Botany Bay Settlement. A monument was erected on the place where Captain Cook landed.

BOTETOURT (bŏt′e-tōōrt), **Norborne Berkeley,** public man, born in England about 1734; died Oct. 15, 1770. He became a peer in 1764, and four years later was made governor of Virginia. In 1769 the colonists protested against taxation and for sending accused persons to England for trial, and he dissolved the legislature which passed resolutions against the taxation laws. After failing to effect a conciliation, he demanded his recall and this the government granted.

BOTFLY (bŏt′flī), a large, yellowish fly, parasitic in its early stages upon certain animals. The fully developed fly is more than a half inch in length, and the female has an extensile abdomen. They lay their eggs upon the hair of the horse, which the animal removes to the stomach by the tongue. There they are hatched and the larvae hang to the coats of the stomach, where they remain about a year, when they are discharged with the excrement, and after a brief time become perfect flies. The bots are very injurious to the horse, when a large number infest the stomach. Botflies are likewise troublesome to sheep, cattle, and some of the wild animals, but the species differ, and those that infest sheep bore through the skin, under which the larvae mature.

BOTHA (bō′tȧ), **Louis,** soldier and statesman, born at Greytown, Natal, in 1864. He spent his early life on a farm in the Vryheid district, where he engaged in sheep and cattle raising, and later became a prominent member of the *volksraad* at Pretoria. At the beginning of the Anglo-Boer War, in 1898, he was given an important command, and distinguished himself at Colenso and Spion Kop. In 1900 he was commander in chief of the Boer forces. After the war he supported the Boer-British coalition party, and in 1907 was made premier of the Union of South Africa. In 1915 he headed the British invasion of German Southwest Africa. He died Aug. 28, 1919.

BOTHNIA (bŏth′nĭ-ȧ), **Gulf of,** the northern extension of the Baltic Sea, between Sweden on the west and Finland on the east. It is about 430 miles long, 85 to 135 miles wide, and from 100 to 130 feet deep. The water is but slightly salty, owing to the inflow of numerous rivers and the limited evaporation due to its location in a cold region. It contains a number of good harbors and is the seat of much activity in the summer season for lumber, mineral, and fish exports by water navigation. In the winter it is frozen over and is crossed on the ice. It yields large quantities of fish, including herring, salmon, and mackerel.

BOTHWELL (bŏth′wĕl), **James Hepburn, Earl,** known for his marriage to Mary, Queen of Scots, born in 1536; died in 1578. In 1557 he occupied an influential position in Parliament. The murder of Queen Mary's husband, Darnley, was thought to have been committed by him. He was tried, but acquitted when he appeared at court with 4,000 sympathizers. He divorced his own wife and forcibly carried Queen Mary a prisoner to Dunbar Castle, where he required her to marry him, having previously been created Duke of Orkney. The nation was aroused with indignation. Mary was imprisoned at Edinburgh and he fled to Malmo, on the coast of Sweden, where he died.

BO TREE, or **Peepul,** the sacred fig tree of India and Ceylon. Trees of this kind are planted by the Buddhists near their temples. They yield a small edible fig, which is of little value, but the sap yields caoutchouc and the lac insect makes the tree its abode. At Anarajapura, in Ceylon, is a famous bo tree that was planted about 288 B. C. It is venerated by the Buddhists, since it is said that Vishnu was born under this tree. In 1887 it was partly destroyed.

BOTTA (bŏt′tȧ), **Paul Émile,** traveler, born in Turin, Italy, Dec. 2, 1802; died March 29, 1870. He went to Egypt in 1830 as a physician of Mehemet Ali, and subsequently became French consul in Alexandria. In 1843 he made excavations near the Tigris for monuments of Assyria and there discovered the palace of Sargon, King of Assyria. He published a work entitled "Monuments of Nineveh."

BÖTTGER (bĕt′gẽr), **John Friedrich,** inventor, born at Schleiz, Germany, Feb. 4, 1682; died March 13, 1719. He began his career as an apothecary in Berlin but soon gave his attention to his chief object of discovering how to make gold. After spending much time and making many experiments, he originated the celebrated Meissen porcelain. In his efforts he had the support of the King of Saxony, who afterward established a porcelain manufactory and placed Böttger in charge of it.

BOTTICELLI (bŏt-tē-chĕl′lē), **Alessandro Filipepi,** painter, born in Florence, Italy, in 1447; died in 1510. His name originally was Alessandro Filipepi, but he took the name Sandro Botticelli from his first master, a goldsmith. Subsequently he studied painting under Fra Lippo Lippi, a Carmelite monk, and from him acquired an early style much admired. In 1480 he finished his "Birth of Venus," now in Florence, and subsequently produced many pictures represented in the leading galleries of Europe. He became a disciple of Savonarola, and later in life studied theology with greater zeal than characterized his efforts in painting. His chief works include "Adoration of the Three Kings," "The Triumph of Spring," "The Nativity," and "Virgin with the Child and Saint John."

BOTTLE, a vessel with a small neck, usually made of glass, and used to contain liquids. In ancient times bottles were made of leather, especially by the Egyptians and Greeks, and bottles of this class are still used in Spain, Sicily, Africa, and the East. Glass bottles have been found in the ruins of Pompeii similar to those in common use at present. They are manufactured by a process of glass molding. The small bottles are made of flint glass and the large ones of a cheaper grade of glass. In manufacturing a blowtube is used, and the molten material is placed in an iron mold.

BOUCICAULT (bōō-sē-kō'), **Dion**, author and actor, born in Dublin, Ireland, Dec. 26, 1822; died Sept. 18, 1890. He studied at University College, London, and took up the work of an architect, but soon gave it up for dramatic work. In 1841 he completed his "London Assurance," written in conjunction with John Brougham, and it was dramatized and acted successfully at Covent Garden. He became an actor in 1852, and the following year toured America, remaining until 1860, when he returned to London. He opened a theater in London in 1862, but the venture did not prove successful, and after 1876 he resided in New York City. As a playwright he was very prolific and produced about 300 pieces of different kinds, mostly dramatic. Among his best works are "Louis XI.," "Old Heads and Young Hearts," "Corsican Brothers," "The Streets of London," "The Irish Heiress," "Flying Scud," and "The Shaughraun."

BOUGAINVILLE (bōō-găn-vēl'), **Louis Antoine,** navigator, born in Paris, France, in 1729; died there Aug. 31, 1814. After taking a course of instruction in law, he entered the army, and in 1756 was dispatched to Canada as aid-de-camp to General Montcalm. In 1761-63 he served in the Seven Years' War, and then commanded an expedition to the Falkland Islands with the view of effecting colonization. In 1766 he set sail on a tour to circumnavigate the globe, by which he materially enriched geography, and returned to Nantes in 1769. Napoleon I. conferred upon him the badge of the Legion of Honor, and made him a senator and count of the empire.

BOULANGER (bōō län-zhâ'), **Georges Ernest Jean Marie,** general and statesman, born at Rennes, France, April 29, 1837; died by suicide Sept. 30, 1891, upon the grave of Mme. de Bonnemain, who was his mistress. His education was secured at Saint Cyr. He became a lieutenant in the army, in which capacity he served in Italy, Algeria, and Cochin China. In the War of 1870-71 with Germany he served at Metz with Bazaine, but escaped to Paris, and became lieutenant colonel under the government of national defense. He was the head of a delegation of French officers in 1876, on the occasion of the centenary celebration of the American independence. He commanded the army in Tunis in 1885, was war commissioner in 1887, and was elected member of the chamber of deputies in 1888. He was charged with misappropriation of public funds and fled to England for safety. His subsequent trial resulted in his formal exile. He ranked as a man of remarkable energy and personality.

BOULDER (bōl'dẽr), a city in Colorado, county seat of Boulder County, on Boulder Creek, 5,835 feet above the level of the sea. It is situated twenty-five miles northwest of Denver, on the Union Pacific, the Colorado and Southern, and other railroads. The surrounding country is fertile, yielding considerable quantities of cereals, vegetables, fruits, and live stock. It has vast mining interests. It is a favorite resort for tourists and invalids, who come here on account of numerous thermal and mineral springs. Among its public institutions are a large sanitarium, the county courthouse, and the University of Colorado. It was incorporated in 1871. Population, 1900, 6,150; in 1920, 10,989.

BOULDER, a large rock found at a distance from the formation to which it belongs. The term *erratic boulder* is generally applied to rocks found lying detached on the surface, and *boulder clay* is used to describe the glacial drift, usually a compact blue or red clay, in which the boulders are found. These formations belong to the early quaternary times and are widely distributed. Boulder clay has been traced over vast regions of British America and the northern part of the United States. In Scotland it is known as *till.* Boulders belonging to the rocks of the Scandinavian peninsula are scattered over the plains of Denmark and northern Germany. Rocks of this class are abundant in the central section of North and South Dakota. It is thought that they were deposited from icebergs and glaciers.

BOULDER DAM, the great dam authorized by Congress, in 1928, in the Colorado River, located about forty miles from Las Vegas, Nevada. The height is 550 feet and the authorized cost is $165,000,000. It is designed for power, irrigation, and the protection of the lower Colorado River basin against overflows.

BOULOGNE-SUR-MER (bōō-lōn'sur-mâr'), a seaport city of France, at the mouth of the Lianne River, on the Strait of Dover, about twenty miles southwest of Calais. The city is divided into the older and the newer parts, or the old and new districts, and has a castle which dates from 1231. It has vast commercial interests, owing to its fine harbor, extensive wharves, and excellent steamboat and railroad facilities. The manufactures include linen and woolen goods, machinery, earthenware, soap, clothing, and canned fish. It has a large export trade in coal, wine, dairy products, fish, corn, and various manufactured articles. Municipal facilities include waterworks, electric lighting, and a system of electric railways. Population, 1921, 51,201.

BOULOGNE-SUR-SEINE (-sān), a town of France, in the department of Seine, five miles west of Paris. It is on the Seine River, a suburb of Paris, with which it is connected by a fine stone bridge. The celebrated park and promenade in Paris, Bois de Boulogne, was named from this town. Population, 1922, 49,969.

BOUNTY (boun'tĭ), in economics, a premium paid by the government to the producers, exporters, or importers of certain articles. This is done to aid in fostering a new enterprise during its infancy, or protecting one long established, owing to its special benefit to the country. In 1890 the Congress of the United States authorized the payment of a premium to producers of sorghum, cane, and beet sugar by way of a bounty. This was done with the view of eventually increasing the production of sugar to equal the annual consumption. By reason of this encouragement large investments were made in sugar-producing interests and the production has been correspondingly increased. The term is applied to a government grant made to induce enlistments in the army, as at the time of the American Civil War, when from $50 to $900 was paid as an inducement for men to enter the service. Men serving in the British army in India receive a bounty as an inducement to extend the time of service.

BOUNTY JUMPERS, a term applied during the Civil War to persons who volunteered to secure a bounty and then deserted to enlist again in some other locality, under a different name, in order to secure another bounty. The government applied a severe penalty, but a number of persons took great risks, owing to the bounty being quite large.

BOURBON (bo͞or'bŭn), a highly celebrated French family which has furnished a large number of celebrated kings, statesmen, and warriors. It dates back to the 10th century, and still has descendants who are important in several states of Europe. From it descended the Bourbons of France, Spain, and Naples. It derived its name from the *Bourbon,* a castle and state of central France, now the department of Allier. The family was first known in history through Adhemar, who was lord of the state, and whose family increased in power and territorial possessions until, in 1272, Beatrix, a daughter of John of Burgundy and Agnes of Bourbon, married Robert, a son of Louis IX. of France, and thus connected the Bourbons with the Capets. The first king of France of the Bourbon family was the famous Henry of Navarre, who became Henry IV. in 1589. His descendants reigned continuously until 1792, and again after the fall of Napoleon, from 1815 to 1848. The kings of the French royal line of the house of Bourbon are in this order: Henry IV., Louis XIII., XIV., XV., XVI., XVIII., and Charles X. The house of Orleans, a branch of this family through Philip of Orleans, brother of Louis XIV., was raised to the throne of France by the revolution of 1830, but lost it by the revolution of 1848. The present head of the French house of Bourbon is the Count of Paris, an Orleanist.

The Spanish-Bourbon branch of the house of Bourbon originated in 1700, when Louis XIV. placed the Duke of Anjou, who was his grandson Philip, on the Spanish throne as Philip V. of Spain. This dynasty reigned consecutively until 1868, when Queen Isabella was dethroned, but regained the crown in 1874. The present occupant of the Spanish throne, Alfonso XIII., born in 1886, is a descendant of Philip V. The Neapolitan branch of the Bourbon family was founded through the Duke of Anjou, and ruled in Naples until that state became a part of Italy in 1860. Another branch ruled in Parma and Piacenza the greater part of the time from 1748 until the two states became annexed to the kingdom of Italy.

BOURBON (bo͞or-bôn'), **Charles,** Duke of Bourbonnais, styled Constable de Bourbon, born Feb. 17, 1489; died May 5, 1527. He was the only heir of the Count of Montpensier. By marriage with the only daughter of the Duke of Bourbon, he united the vast estates of the two branches of the Bourbon family. His high rank in birth and wealth, his brilliancy in arms, and rigid morals soon caused him to hold a high position in the government of France. At the age of twenty-six years he was given the constable's sword by Francis I., and was appointed to lead an army into Italy. He disciplined the army, crossed the Alps in 1515, and won a decisive battle at Marignano. By his successes he soon gained the reputation of being the greatest general of his time, and was made governor of Milan. Owing to complications with Maria Louise, mother of the king, his estates were seized. Accordingly, he renounced the interests of France and formed an alliance with Charles V. of Spain and Henry VII. of England. He gathered an army of 6,000 German lancers and united them with Spanish troops, and fought in the Battle of Pavia, Feb. 24, 1525, in which the French army was defeated and Francis I. taken prisoner. He now became Duke of Milan and commander of a Spanish army in Italy. In 1527 he attempted to seize Rome, but was killed by a bullet fired at him by Benvenuto Cellini, the Italian artist. He was highly respected by his soldiers, who carefully carried his body to Gaeta and erected a monument to his memory.

BOURGES (bo͞orzh), a city of France, capital of the department of Cher, 135 miles south of Paris. It is located at the junction of the Auron and Yèvre rivers, and is the focus of important railroad lines. In the old part the streets are crooked and poorly improved, but the newer section has many fine public and residential buildings. It is the seat of a college, a public library, a normal school, and a magnificent Gothic cathedral, known as the Cathedral of Saint Etienne. The trade is chiefly in wine, cereals, and live stock. Among the manufactures are clothing, leather, wine, and machinery. Julius Caesar captured it in 52 B. C., when it was known as *Avaricum.* Charles VII. of England made it his capital when Orleans was in the hands of the English. Population, 1921, 44,133.

BOURGET (bōōr-zhȧ′), **Paul,** novelist and essayist, born in Amiens, France, Sept. 2, 1852. His father was a Russian who had settled in France as professor of mathematics at the Lyceum of Clermont-Ferrand, where he studied for some time and afterward attended the College of Sainte Barbe. In 1873 he began to devote his time to literary work, though his active career as a writer began about ten years later. With unusual devotion to the study of literature, he rapidly gained a reputation as writer and critic, and carried realistic observation into his work. In 1895 he was admitted to the French Academy, and he may be classed in the front rank of novelists and essayists. His chief publications include "Cosmopolis," "Le Disciple," "Outre-Mer," and "Mensonges."

BOURINOT (bōō-rĭ-nō′), **John George,** historian, born in Sydney, Nova Scotia, Oct. 24, 1837; died Oct. 13, 1902. He attended public schools and Trinity College, Toronto, and for many years edited the *Halifax Reporter.* In 1880 he was chosen chief clerk of the House of Commons of the Dominion, and two years later became an official in the Royal Society of Canada. Besides contributing numerous articles to magazines in Canada and England, he published many works relating to government and constitutional law. His publications include "Manual of Constitutional History," "Canada Under British Rule," "Parliamentary Government in Canada," "Parliamentary Procedure and Practice," "Canada's Intellectual Strength and Universities," and "Captain Breton and his Memorials to the French Régime."

BOUTELLE (bōō-tĕl′), **Charles Addison,** journalist and politician, born in Damariscotta, Maine, Feb. 9, 1839; died May 21, 1901. After attending the public schools and at Yarmouth Academy, he entered the merchant marine, in 1862, enlisted in the United States navy for service in the South Atlantic, and participated in the capture of Mobile. In 1866 he was honorably discharged, being then in command of the naval forces in the Mississippi Sound, and soon after engaged as publisher of the *Bangor Whig and Courier.* He was a delegate to the Republican national convention of 1876 and to three succeeding national conventions, and in 1880 was elected to Congress as representative at large and was reëlected eight times. As a member of Congress he served on many important committees, and did much to promote the enlargement of the United States navy.

BOUTWELL (bout′wĕl), **George Sewell,** statesman, born in Brookline, Mass., Jan. 28, 1818; died Feb. 27, 1905. He became a merchant at Groton, in which occupation he remained until 1855. During convenient times he read law and entered politics in 1840. He was elected seven times to the Legislature as a Democrat, and was Governor in 1851-52. When the Republican party was organized, he went over to that organization, and was twice elected to Congress on the Republican ticket. In 1869 he was made Secretary of the Treasury by President Grant, but resigned that position in 1873 to enter the United States Senate. He was for six years overseer of Harvard College, and wrote many able articles on taxation, finance, and educational topics.

BOW (bō). See **Violin.**

BOW, a weapon used in the chase and in war from remote antiquity, and still employed by savages in warfare and in many countries as a means of amusement. Two forms of the bow are in use, the *longbow* and the *crossbow.* The former is the earlier kind and the more celebrated, having been used as the weapon of archers in the Middle Ages. It passed out of use as a military weapon with the improvement of firearms. The crossbow is now used in some field sports. It is made by attaching a bow to a stock resembling a musket, and discharges a short and stout arrow called a *quarrel.* The longbow is about five feet long, and discharges an arrow three feet long, furnished with a steel head. Wood is used most generally, such as yew, elm, and wych-hazel, though steel and other elastic materials make good bows. The savages usually poison the end of the arrows used in war.

BOWDOIN (bō′d'n), **James,** statesman and author, born in Boston, Mass., Aug. 8, 1727; died Nov. 6, 1790. He was a graduate of Harvard and a man of profound learning. In a correspondence he suggested that the phosphorescence of the sea is due to the presence of minute animaculae, a theory now generally accepted. He carried on a correspondence with Benjamin Franklin, who read many of his letters before the Royal Society of London, under whose direction they were published. He was president of the Massachusetts Constitutional Convention, and was elected Governor of the State in 1785. Bowdoin College was named in in his honor. His son, James Bowdoin, Jr., born in Massachusetts, Sept. 22, 1752, died Oct. 11, 1811, was educated at Harvard and Oxford, England, and became a noted writer and public man. He was sent as minister to Spain in 1804 and served in other official capacities.

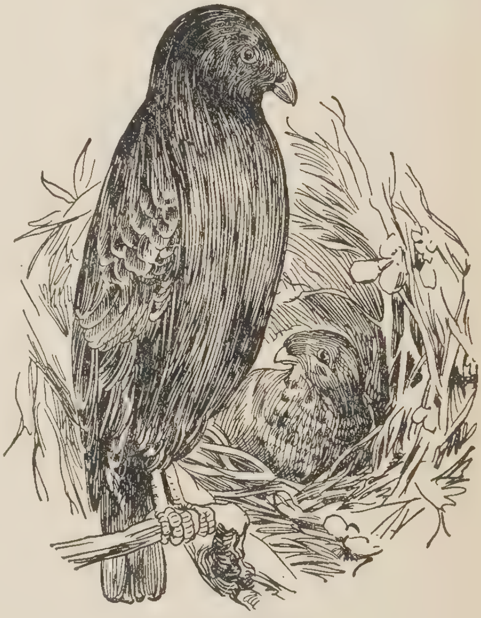
BOWDOIN COLLEGE, the oldest seat of learning in Maine, and one of the earliest educational institutions established in the United States. It was incorporated at Brunswick by the General Court of Massachusetts on June 24, 1794, and received an endowment of six townships of wild lands in the then District of Maine. It bears the name of Governor James Bowdoin, a friend of Washington and Franklin, and who was eminent in the councils of his native State. His son, Hon. James Bowdoin, United States minister to France and Spain, was its earliest individual benefactor. His paintings, drawings, and private library were donated to the institution, and the last mentioned is now in Hubbard Hall, a fire proof building erected at a cost of $300,000.

Upon the foundation of the traditional four years of classical and disciplinary studies, there have been added the numerous elective courses in history, modern languages, and the social sciences, so arranged that the well prepared student of more than average ability can complete the requirements for the degree of A. B. in three years. Special facilities for the study of natural sciences are afforded by the laboratories of the Searles Science Building. Throughout the curriculum all the teaching is done by professors in distinction from temporary instruction. The present endowment is four million dollars and its plant is estimated at nearly as much. In 1820 the Medical School of Maine was established under the control of the president and trustees of Bowdoin College, but it was discontinued in 1922. The first two years of the course were pursued at Brunswick and the last two at Portland, on account of clinical advantages from the hospitals. Bowdoin is remarkable in the number of its alumni, who have won national prominence. They include Chief Justice Fuller, Nathaniel Hawthorne, Henry W. Longfellow, and Thomas B. Reed. The average attendance is about 500 students.

BOWELL (bou'el), **Sir Mackenzie,** statesman, born in Suffolkshire, England, Dec. 15, 1823. He came to Canada at the age of ten years and settled at Belleville, Ontario, where he became editor and proprietor of *The Intelligencer.* This newspaper exercised a wide influence politically as a conservative organ. In 1867 he was elected to the Parliament of Canada and became minister of customs in 1878, serving until 1891, when he was made minister of defense. In 1892-94 he was minister of trade and commerce, and subsequently was president of the Privy Council. He was chosen premier in 1896, and was long a leader of the Conservative opposition. He died Dec. 10, 1917.

BOWEN (bō'ĕn), **Francis,** author and lecturer, born at Charlestown, Mass., Sept. 8, 1811; died Jan. 21, 1890. He studied at Harvard University, where he graduated in 1833, and was editor of the *North American Review* in 1843-54. In the latter year he became professor of natural religion, moral philosophy, and civil polity at Harvard. He opposed the free trade views of Adam Smith and the philosophical systems of Kant, Fichte, and John Stuart Mills. His writings embrace "Gleanings from Literary Life," "Resources and Institutions of the American People," "Treatise on Logic," "Principles of Political Economy," and "Critical Essays on Speculative Philosophy."

BOWER BIRD (bou'ẽr), the name of certain birds belonging to the bird of paradise family, native to Australia and New Guinea. They were so named from the remarkable bowers or galleries which they construct. In size the different species vary somewhat, but the representative class is about the size of a jackdaw, and the plumage in the males and females is dissimilar, being a satin black in the former and a grayish-green in the latter. The bowers, built of twigs and leaves, are decorated with shells, flowers, bones, feathers, and other conspicuous objects. They are not nests, but places of amusement, and in them the male performs queer antics to attract its mate. Both in architecture and ornamentation, these birds show remarkable skill and taste.



SATIN BOWER BIRD.

BOWLES (bōlz), **William Lisle,** clergyman and poet, born at King's Sutton, England, Sept. 24, 1762; died April 7, 1850. He studied at Trinity College, Oxford, and became a vicar in Wiltshire. Subsequently he was made prebendary of Salisbury Cathedral, where he spent the remainder of his life. He possessed great personal attainments. In 1807 he edited the works of Pope and attacked this writer in a biography, by which he became involved in a controversy with Byron on the question whether Pope was a poet. His chief poetic works are "Fourteen Sonnets" and "The Spirit of Discovery."

BOWLING (bōl'ĭng), an athletic game and popular amusement originated in England by the Anglo-Saxons. It is played chiefly indoors, though formerly it was an outdoor amusement and was played on a level piece of greensward.

No game is more popular now at the practice rooms of athletic societies and in the gymnasiums of social and commercial clubs. In many cities the game is played in halls built especially for the purpose, and in which it is the only form of amusement. Each hall has one or more platforms called *alleys.* The alleys are carefully fitted with a hard floor, slightly convex in the center, and on each side is a gutter to catch the ball if it is not accurately rolled. At the further extremity ten pins are set up by an attendant, usually a boy. The pins are in most cases of ash wood, about a foot in height and about two pounds in weight, and are arranged in the form of a pyramid, with the apex toward the bowler. A slanting roadway at one side of the alley serves to return the balls to the player. Each player may roll two balls, which are about twenty inches in circumference and sixteen pounds in weight. The balls are provided with thumb holes to enable the player to secure a firm hold. A *strike* is made when all the pins are knocked down with a single ball, and a *spare,* when all are knocked down with the two balls. Ten *innings* or *frames* make the game, and the one who knocks down the largest number of pins is the winner. The sizes of the pins and of the balls vary somewhat, and various games or matches are played, but these are too complicated to admit of full description except in a book of rules.

BOWLING GREEN, the county seat of Warren County, Kentucky, on Barren River, about seventy miles north of Nashville. It is on the Louisville and Nashville Railroad. The city has electric lights, waterworks, a fine courthouse, and two parks. It is the seat of numerous factories, including iron foundries, saw mills, flouring mills, and machine shops. The surrounding region is agricultural and has natural gas deposits. Besides having good schools, it is the seat of a Catholic academy and of Ogden College. It was incorporated in 1812. Population, 1900, 8,226; in 1920, 9,638.

BOWLING GREEN, a city in Ohio, county seat of Wood County, twenty miles south of Toledo, on the Baltimore and Ohio and the New York Central railroads. The chief buildings include the city hall, the county courthouse, and the central high school. It has manufactures of cut glass, canned fruits, ironware, and machinery. The municipal improvements include waterworks, gas and electric lighting, and a central heating system. It has a large trade in grain and farm produce. Bowling Green was settled in 1832 and was incorporated in 1854. Population, 1920, 5,788.

BOX-ELDER, or **Ash-Leaved Maple,** a small tree of North America, widely distributed in Canada and the United States. It is planted very extensively as a shade tree and for windbreaks, because of its ability to withstand almost any extremes in climate. It grows rapidly and begins to bear seed in four or five years. The wood is of little value, but is used as fuel where timber is scarce.

BOXING, a match between two persons who strike each other with the fists. Formerly this art of amusement or exercise was an exhibition of pugilistic skill, in which the participants sought to punish each other, but modern boxing has partaken form among the athletic exercises. When conducted under recognized rules, such as the *Queensberry Rules,* the elements that enter into a prize fight are eliminated and it is placed among the more meritorious amusements. The participants are classified according to their weights in six divisions, known as bantam, feather, light, welter, middle, and heavy. The maximum weights in each class are: *Bantam,* 105 pounds; *feather,* 115 pounds; *light,* 135 pounds; *welter,* 145 pounds; *middle,* 158 pounds; *heavy,* over 158 pounds. Boxers wear, as a means of preventing injury, thickly padded gloves, made of soft and pliable leather, to cover the back of the hand, the fingers, and the thumb. The rules are very numerous and provide regulations for matches of different kinds. In 1866 the Amateur Athletic Club was founded in England, and later the Amateur Athletic Union was organized in the United States. Contests for championships have been numerous, and the art of boxing will likely be maintained as an active and healthful exercise, but pugilistic contests in the nature of prize-fights are prohibited by law in most countries.

BOX TREE, an evergreen tree, from 12 to 15 feet high, native to Europe and Asia. It was cultivated by the ancient Greeks and Romans as an ornamental shrub in their gardens, and the wood was used for making boxes and ornaments. It is native to England and thrives in the countries bordering on the Mediterranean. The wood is hard, heavy, and yellowish in color, and takes a high polish. Most of the boxwood of commerce comes from the regions adjoining the Caspian and Mediterranean seas, where it is cultivated.

BOYCOTTING (boi'kŏt-ing), the name generally applied to a system under which a society or class decline to buy or sell to some individual or class of individuals. The name came from Captain James Boycott, who was the land agent at Mayo, Ireland, for Lord Erne, an Irish nobleman. On account of gross offenses to the people no one would assist in gathering his crops. The case was publicly reported and resulted in a *Boycott Relief Expedition* by which the crops were secured and the owner protected. Boycotts are prohibited by law in many states of the Union and have been a subject for legislation in most countries.

BOYDELL (boi'dĕl), **John,** engraver, born in Dorrington, England, Jan. 19, 1719; died Dec. 1, 1804. He studied engraving in London and promoted the art by patronizing native painters and engravers. These included Reynolds, West, and Opie, and from their pictures were made illustrations for the works of Shakespeare. His engravings were combined in one work under the title of "Shakespeare Gallery." In 1790 he was Lord Mayor of London.

BOYESEN (boi'e-sen), **Hjalmar Jhorth,** educator and novelist, born in Frideriksvärn, Norway, Sept. 23, 1848; died Oct. 4, 1895. He graduated at the University of Norway in 1868, and subsequently studied at Leipzig, Germany. Later he came to the United States and was editor of *Fredmad,* a Scandinavian journal published in Chicago. His writings are in the English, German, and Norwegian languages. They include "Tales from Two Hemispheres," "Essays on Scandinavian Literature," "Gunnar: A Norse Romance," "Essays on German Literature," "Queen Titania," and "Idyls of Norway."

BOYLE, (boil), **Robert,** celebrated natural philosopher, born at Lismore Castle, Ireland, Jan. 25, 1627; died Dec. 30, 1691. He was the seventh son of fourteen children of Richard Boyle, Earl of Cork. He became one of the first members of the Royal Society, which was organized in 1663. At Oxford he demonstrated the elasticity of air by means of an air pump. Boyle's Law, according to which the volume of a gas varies in proportion to the pressure to which it is subjected, was discovered by him.

BOYNE (boin), a river in Ireland, rises in the Bog of Allen, and flows into the Irish Sea, after a course of about sixty miles. The adherents of James II. and William III. fought a battle on its banks in 1690, in which the former were utterly routed and compelled to flee in disorder. The anniversary of this victory, July 12, is still celebrated by Irish Protestants. On the battle-field is a monument 150 feet high.

BOYNE CITY, a city of Michigan, in Charlevoix County, on Pine Lake and on the Boyne City, Gaylord and Alpena Railroad. Among the noteworthy buildings are the high school, city hall, public library, and a fine hotel. The industries include lumber mills, chemical factory, and tanneries. It was settled in 1880. Population, 1920, 4,284.

BOY SCOUTS, an organization whose purpose is to encourage and elevate boys, especially in the development of thrift, courage and self-control. It was founded by Daniel Carter Beard in May, 1905, and was incorporated as the Boy Scouts of America by Act of Congress in June, 1916. Sir Baden Powell is the founder of a similar organization in Great Britain, known as the Boy Scout Movement, which in 1923 had over 500,000 members. The membership in America, in 1928, was 819,609.

BOZEMAN (bōz'man), a city of Montana, county seat of Gallatin County, 95 miles southeast of Helena. It is on the Gallatin River, the Northern Pacific, and the Milwaukee railways. It has a large trade in agricultural products, merchandise, and live stock. The surrounding country has gold, silver, coal, and iron ore deposits, and large interests in farming and stock raising. Among its industries are flouring mills, brickyards, stone quarries, and machine shops. It is the seat of the State College of Agriculture and Mechanic Arts. Among the public buildings are a library, the county and municipal buildings, and several schools and churches. Population, 1920, 6,183.

BOZZARIS (bŏt'sȧ-rēs), **Marco,** Greek hero and patriot, born at Suli, in the mountains of Epirus, in 1788; slain in battle Aug. 20, 1823. His life was one of military excitement and combat for liberty. He retired to the Ionian Islands after the fall of Suli, in 1803, and joined other refugees in a struggle to deliver his native country from the Turks. In 1820 he united with Ali Pasha and rendered valuable services. After the death of Ali Pasha, he continued his opposition to the Turks, and later united his forces with the Greek army, in which he became general. He was commander in chief of the Greek forces at Missolonghi in 1823. On Aug. 20 he led his army upon a daring night attack to the camp of the enemy, near Carpenisi, and routed the opposing forces with great slaughter. The Turkish army numbered about 13,000, and Bozzaris led 1,200 against the vanguard of 4,000 warriors. His successful exploits were attended with great skill and personal bravery, but he was slain while leading to the final attack. The Greeks still celebrate his deeds in popular songs. His heroic bravery is recounted in a poem by Fitz-Greene Halleck, entitled "Marco Bozzaris."

BRABANT (brä'bant), a district in the central lowlands of Holland and Belgium. It formerly constituted an independent duchy, but has had many rulers and alliances in the past four centuries. In 1648 it was incorporated with the United Provinces, after the famous revolt of the Netherlands against King Philip. It was divided by the Peace of Utrecht in 1714, when a portion passed to the Spanish crown. It became a part of the Netherlands in 1814, and was again divided in 1830 into the provinces of Antwerp, North Brabant, and South Brabant. In the same year Antwerp and South Brabant were made a part of Belgium. North Brabant has an area of 1,980 square miles and a population of 628,089, and belongs to Holland. The province of Antwerp has an area of 1,093 and a population of 875,682; and South Brabant, an area of 1,268 square miles, and a population of 1,475,490. The southern portions are inhabited by Walloons, the central by Flemish, and the northern by Dutch. South of Brussels the language is chiefly French and in the northern part it is Flemish, Dutch, and German. The subdivisions are all densely populated. The soil is fertile, producing cereals, sugar beets, vegetables, and grasses, and large interests are vested in manufacturing. Among the large cities included are Antwerp and Brussels.

BRACE (brās), **Charles Loring,** author and humanist, born at Litchfield, Conn., June 19, 1826; died at Campfer, Switzerland, Aug. 11, 1890. He graduated from Yale in 1846, and continued his studies at Union Theological Seminary. In 1850 he made an extended tour through England, Ireland, Germany, Belgium, and Italy. He lectured extensively, and established several institutions for the care of poor children and the poorer classes. His writings include "Walks and Talks of an American Farmer in England," "Home Life in Germany," "Dangerous Classes of New York," "Hungary in 1851," and "Short Sermons to Newsboys."

BRADDOCK (brăd'dŭk), a borough in Allegheny County, Pennsylvania, on the Monongahela River, ten miles southeast of Pittsburg. It is on the Pennsylvania, the Baltimore and Ohio, and other railroads. Among the chief buildings are the public hall, several schools, and the Carnegie Library. The manufactures include ironware, cement, plaster, boilers, steel rails, and railway cars. It has waterworks, street pavements, and electric street railways. It is noted as the scene of the Battle of Braddock's Field, in 1755. The first settlement was made in 1795 and it was incorporated in 1867. Population, 1900, 15,654; in 1920, 20,879.

BRADDOCK, Edward, soldier, born in Perthshire, Scotland, in 1695; killed in battle July 13, 1755. He came to America soon after the opening of the French and Indian War. In 1755 he led an expedition against Fort DuQuesne, near Pittsburg, Penn. With a force of 2,200 men, accompanied by George Washington, he moved upon his expedition. On the morning of July 9 an ambuscading party of 900 left the fort. The British were advancing through thick woods when they were assailed from all sides by French and Indians. For the first time many of the British heard the war whoop and were confused by the peculiar attack from behind rocks and trees. Braddock displayed great bravery, but was mortally wounded after five horses had been killed under him. Washington distinguished himself and successfully covered the retreat. Out of 1,373 British troops only 459 came off unharmed.

BRADDON (brăd'dŭn), **Mary Elizabeth.** See **Maxwell, Mrs. John.**

BRADFORD (brăd'fẽrd), a city in McKean County, Pennsylvania, sixty-three miles southeast of Dunkirk, N. Y., on the Erie, the Pennsylvania, and other railroads. It is located in a productive oil field, and is surrounded by a rich agricultural district. The city has large petroleum works, railroad machine shops, planing mills, glass works, brickyards, and nitroglycerin and torpedo works. There are street railways, electric lights, waterworks, a public park, and several fine schools. It has a fine public library and many schools and churches. The first settlement was made in 1823 and it was incorporated in 1879. Population, 1900, 15,029; in 1920, 15,525.

BRADFORD, a manufacturing city of Yorkshire, England, about twenty-eight miles southwest of York. It is noted for its manufacture of yarn and woolens; not less than 350 mills are in operation. It is beautified by several fine public parks, and has many charitable and educational institutions. The chief buildings include the town hall, the public library, the commercial exchange, the United Yorkshire Independent College, and the Art Museum. Several Protestant demoninations have colleges in or near the city. The transportation facilities include the Bradford Canal, electric railways, and four lines of railroads. Among the manufactures are cotton and woolen goods, clothing, soap, ironware, boilers, and spirituous liquors. It has public waterworks, slaughterhouses, electric and gas lighting, and stone and asphalt paving. The growth of the city in wealth and population has been very rapid the past decade. It was incorporated as a city in 1897. Population, 1921, 288,505.

BRADFORD, William, one of the Pilgrim Fathers, born in Austerfield, England, in 1590; died in Plymouth, Mass., May 9, 1657. He went to Holland in search of religious liberty and joined the English congregation at Leyden. He came to America in the *Mayflower* in 1620. The following year he was elected governor of the Plymouth colony, which position he held thirty-one years. He was one of the most useful men to the early colonists of America. He wrote a history that contains the important events of the colony from 1620 to 1647.

BRADLEY (brăd'lĭ), **Joseph Philo,** jurist, born in Berne, N. Y., March 14, 1813; died in Washington, D. C., Jan. 25, 1892. He graduated at Rutgers College in 1837, and was admitted to the bar three years later. His practice began at Newark, N. J., where he became distinguished on account of success in important law cases and for effective oratory. President Grant appointed him as a justice of the circuit court for the southern circuit, and later for the circuit comprising Pennsylvania, New Jersey, and Delaware. In his official career many important maritime and Civil War cases were adjudicated. He served on the famous Hayes-Tilden electoral commission, his vote awarding the election to R. B. Hayes.

BRADSHAW (brăd'sha̤), **John,** jurist, born in Cheshire, England, in 1602; died Oct. 31, 1659. He studied law and became chief justice of Chester in 1847, and in 1649 was president of the high court which tried and condemned Charles I. After the death of the king, he became president of the council of state, but opposed Cromwell and the protectorate, which caused him to lose influence. Milton eulogized him as a great jurist and statesman. After the restoration of the monarchy, his body was taken from the grave with those of Cromwell and Ireton and exposed on a gibbet in Westminster Hall.

BRADSTREET (brăd′strēt), **Anne,** poet, born in Northampton, England, in 1612; died Sept. 16, 1672. She was a daughter of Thomas Dudley and married Governor Bradstreet, and in 1630 went with him to New England. Her poems, though widely read, lack originality and poetic power. She has the distinction of being one of the first writers in America, and for this reason has a permanent place in the history of New England culture. She published a collection of her poems, in 1650, under the title "The Tenth Muse Lately Sprung Up in America."

BRADSTREET, Simon, colonial governor of Massachusetts, born at Horbling, England, in March, 1603; died at Salem, Mass., March 27, 1697. His education was obtained by studying at Emmanuel College, Cambridge, and for some time he was the steward to the Countess of Warwick. He was sent to America in 1630 to serve as assistant judge of the court of Massachusetts. He held public positions for more than sixty years, and established the reputation of being an able and trustworthy public servant. In 1660 he was sent to England to congratulate Charles II. on his restoration to the imperial throne. He was one of the founders of Cambridge, Mass., and was prominent as an opponent to the famous witchcraft delusion of 1692, at Salem.

BRADY (brā′dĭ), **Cyrus Townsend,** clergyman and author, born in Allegheny, Pa., Dec. 20, 1861. He graduated at the United States Naval Academy, but resigned from service and was connected for two years with railroads in the Mississippi Valley. In 1890 he was ordained priest of the Protestant Episcopal Church and served as rector of churches in Missouri and Colorado, and for a time was archdeacon of Kansas. He was made archdeacon of Pennsylvania in 1895, serving until 1899, when he became rector of Saint Paul's Church at Overbrook, Philadelphia, Pa. He was chaplain in a regiment during the Spanish-American War. His writings are very numerous and include historical essays and several volumes of fiction. Among them are "Commodore Paul Jones," "The Grip of Honor," "Border Fights and Fighters," "The Doctor of Philosophy," "A Midshipman in the Pacific," "Life of Stephen Decatur," and "Recollections of a Missionary in the Great West." He died Jan. 24, 1920.

BRAGANZA (brā-găn′zā), **House of,** the name of the present ruling dynasty of Portugal, and by which the once imperial family of Brazil was known. It was named from the town of Bragança, Portugal. The first member of the family was John IV., Duke of Braganza, who ascended the throne in 1640, after throwing off the yoke of Spain. The oldest son of John VI. became first emperor of Brazil with the title of Dom Pedro I. in 1822. Dom Pedro II., his son, succeeded him, but was forced to abdicate in 1889.

BRAGG (brăg), **Baxton,** soldier, born in Warren County, North Carolina, March 22, 1817; died at Galveston, Tex., Sept. 27, 1876. After graduating at West Point in 1837, he enlisted for service in the Seminole War, and later distinguished himself at the battle of Buena Vista, in the Mexican War, on account of which he was made lieutenant colonel. In 1856 he engaged in agriculture in Louisiana, but when the Civil War commenced he entered the Confederate army, and was placed in command of the forces at Pensacola, Fla. He served at Shiloh, and, after the death of Gen. A. S. Johnston, was commander of the entire Southern forces. He invaded Kentucky in 1862 with 45,000 men, and was defeated at Perryville and again at Murfreesboro, but gained the battle of Chickamauga in 1863. Gen. Grant defeated him at Chattanooga the same year, when he was relieved of his command and became the military adviser of Jefferson Davis. In 1864 he led a force against Gen. Sherman while on his march to the sea, but was unsuccessful in checking the advance of the Union army. After the war he held several official positions in Alabama. His brother, Thomas Bragg (1810-1872), was Governor of North Carolina four years, beginning in 1854; United States Senator in 1859, and attorney general of the Confederacy two years, beginning in 1861.

BRAGG, Edward Stuyvesant, soldier and legislator, born in Unadilla, N. Y., Feb. 20, 1827. He studied at Geneva College, was admitted to the New York bar, and in 1849 removed to Fond du Lac, Wis., where he built up a successful practice. In 1854 he became district attorney, and at the beginning of the Civil War entered the Union service. He was with the Army of the Potomac, commanded the famous *Iron Brigade,* and was mustered out as brigadier general. In 1877 he was elected to the Wisconsin Legislature, and the following year was sent to Congress as a Democrat, and was reëlected several times. He was minister to Mexico in 1888, and in 1902, became consul general to Havana, but the same year was sent as consul general to Hongkong. He died June 20, 1912.

BRAHE (brā), **Tycho,** celebrated astronomer, born in Knudstrop, Denmark, Dec. 4, 1546; died at Prague, Austria, Oct. 24, 1601. He descended from a noble Swedish family which had resided in Denmark for some years. He studied philosophy and rhetoric at Copenhagen, and after the great eclipse of the sun on Aug. 21, 1560, which occurred at precisely the time foretold by the astronomers, he began to study astronomy, regarding it as something divine. His uncle sent him to Leipsig to study law, but he continued studying astronomy with profound interest. He constructed various apparatus with which to gain knowledge of the heavenly bodies, and in 1571 was favored by an uncle with aid to secure material and appliances to carry on his investigations. Frederick II., King of Denmark, bestowed upon him the island of Huen, in the Sound, on which to erect an observatory and laboratory, together with a pension of two thousand crowns out of the public treasury. Fitted up in this way, he built a castle which he named *Uranienburg.* With the death of the king his pension was discontinued, and he was compelled to leave the country, owing to poverty and the general opposition of his countrymen, and he spent the remainder of his life in Germany. Rudolph II., King of Germany, showed him many marks of respect and granted him a pension of three thousand florins. The great astronomer, Kepler, was with him as a student. After his death Kepler made use of his discoveries and apparatus, which he used effectively in his own astronomical researches.

BRAHMA (brä′må), the first person in the Hindu trinity, which consists of *Brahma, Vishnu,* and *Siva.* Brahma is worshiped as the universal power or basis of all existence, by certain castes of India. The three taken separately represent the *creator,* the *preserver,* and the *destroyer.* Brahma, the creator, as a personal god, is represented as a personage of a red color, with four heads and four arms. In one of the hands he holds a portion of the Vedas, in one a lustral vessel, in one a rosary, and in one a sacrificial spoon. As a person he represents merely the agent of Brahma, the universal power, and is the god of the fates and master of life and death. His worship is common among the Brahmans.

BRAHMANISM (brä′man-ĭz′m), the religious and social system developed and expounded by the Brahmans, a religious caste among the Hindus. The ancient religious writings called the *Vedas,* the basis of the system, are held sacred and inspired. It is thought that the oldest of the writings were composed and uttered from 2400 to 2000 B. C. Max Müller, the German antiquarian, translated the Rig-Veda and regarded the whole as dating from about the 15th century B. C. However, its origin dates from no particular century, but seems to have been added to at many different periods as the priestly caste increased in number and power. In time the system became complex, and at least three other great castes originated.

The four early castes were the Brahmans, Kshatriyas, Vaisyas, and Sudras. The first are the philosophers, scholars, statesmen, and administrators of the Aryan people of India. To them the Sanskrit language and literature owes its origin. The second class consists of the warriors, the third class is constituted of the merchants, and the fourth class comprises the laborers. The Brahmans now represent about one-tenth part of those who hold the Vedas sacred. They are the most intellectual of all the classes and possess admirable ability for mathematical reasoning and metaphysical speculation. It is probable that the castes previously represented different races. The great diversity of modern industry and various intermarriages have given rise to innumerable distinctions. There are at least several hundred castes among the Brahmans alone, and quite a large number belong distinctively to each of the other three principal divisions. Many of the castes cannot partake of food prepared by others and are not allowed to intermarry.

From the 5th to the 1st century B. C. Brahmanism implied the worship of the one god, *Brahma,* with the three personages, or trinity, *Brahma, Vishnu,* and *Siva.* The idea of a one god and the belief in the first person, Brahma, were too abstract to endure for a long period of time. This led to a general worship of Vishnu, the preserver, and Siva, the destroyer, and the worshipers of these two deities now constitute the two great religious sects of India. The higher classes choose which of the two they prefer and hold the worship only as a means to reach the one first cause, or Brahma. The worship of Vishnu is conducted under the forms known as Krishna and Rama, and that of Siva under the form called Lingam, with the power of Sukti—the power and energy of the divine nature in action. Hindu reformers are falling back to the teaching of the Vedas, that is, Brahma, with the triad Brahma, Vishnu, and Siva, being regarded the one god.

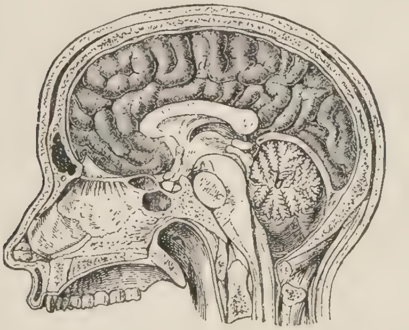
BRAHMAPUTRA (brä′må-pōō-trå), meaning "son of Brahma," one of the great rivers of India. It rises in the plateau of Tibet and has a length of 1,800 miles. In the upper part of its course, where it is known as the Sanpo, it flows southeast along the northern slope of the Himalayas, and as it turns southward through the mountains it assumes the name of Dihong. In Assam it receives the inflow from a number of tributaries and is generally known as the Brahmaputra, a name applied by some writers to its entire course. It joins the Ganges about ninety miles from the Bay of Bengal, where they discharge after forming a common delta. The stream overflows in the rainy season and when the mountain snow melts, usually in June and July, and floods vast plains, rendering them fertile for the production of great quantities of cereals. More than 800 miles are navigable for commercial traffic, while the several channels of the delta furnish excellent inland connection. The river was first explored by Europeans in 1765.

BRAHMS (bräms), **Johannes,** composer of music, born in Hamburg, Germany, May 7, 1833; died April 3, 1897. He received a musical education under the direction of his father, who was noted as a double-base player, and afterward was instructed by Edward Marxsen at

Altona. As early as 1847 he played successfully in Hamburg, and in 1853 he met Schumann, who was so favorably impressed with the young musician that he expressed the view that Brahms would make a high reputation in promoting the development of modern music. In writing of the musician, Schumann said among other things: "Many new and remarkable geniuses have made their appearance. I thought to follow with interest the pathways of these elect. There would, there must, after such promise, suddenly appear one who should utter the highest ideal expression of the times, who should claim the mastership by no gradual development, but burst upon us fully equipped as Minerva sprang from the head of Jupiter. And he is come, this chosen youth over whose cradle graces and heroes seem to have kept watch."

Brahms was a careful student of Wagner's scores, and as a composer is remarkable for having withdrawn largely from society and devoted himself to his chosen art. He was made conductor for the Prince of Lippe-Detmold in 1854, and subsequently studied and conducted in Switzerland, Austria, and in several cities of Germany. His reputation was established in 1868, when his "German Requiem" was rendered at Bremen, and subsequently he produced many symphonies and songs, a total of nearly two hundred. He had aversion to marriage and the opera, enjoyed rugged health most of his life, and was a master and leader in musical art. His chief productions include "Funeral Hymns," "Serious Songs," "How Are You, My Queen," and the "Fourth Symphony."

BRAIN, that part of the central nervous system of animals that is found within the skull. It is held to be the seat of intellectual and mental power in man. The shape, when viewed from above, is somewhat like that of an egg. In composition it is soft and yielding, closely filling the cavity of the skull. It is inclosed in a double membrane called the *arachnoid,* which is as delicate as the web of a spider, and which forms a close sack filled with a liquid resembling water. Within this and within the spaces of the brain is a fine tissue. The tissue, called *pia mater,* is penetrated by many blood vessels, which pass through the hollows. The flow of blood to the brain is so copious that about one-fifth of the entire circulation of the body is used. The *dura mater* is a tough membrane which lines the bony cavity of the skull and incloses the entire brain mass, and separates the various parts of the organ by strong partitions.


b—CEREBELLUM. d—CEREBRUM.

The brain consists of three main parts called the *cerebrum,* the *cerebellum,* and the *medulla oblongata.* The cerebrum consists of two lateral hemispheres united by a thick, strong band of white tissue, and comprises about seven-eighths of the weight of the entire brain. In the lowest animals the cerebrum is wanting. It makes its appearance as the scale of animals rises to higher forms. This part of the brain occupies the front and upper part of the skull. The bulk is composed of white nerve fibers. The fibers intimately connect with the fibers of the gray layer of nervous matter, which is found at the surface. The surface is wrinkled and folded, which gives ample surface for the gray matter, in some individuals as much as 675 square inches. The cerebrum is the center of thought and intelligence. The cerebellum is located in the back of the head, below the cerebrum. It is smaller than the cerebrum, but in construction is quite similar, except that it has parallel ridges instead of convolutions. This enables the gray matter of the cerebellum to lie in the white matter within. The cerebellum is the center for the control of the voluntary muscles, particularly those of motion. The various movements of the body, such as grasping, balancing, and walking, arise in the cerebellum, while the nerve-cells of convolution in the cerebrum are the seat of volition, consciousness, and educational intelligence, and of the faculty of language.

The medulla oblongata is the upper enlarged part of the *spinal cord.* It extends from the upper border of the first vertebra to the *pons,* which are connected at each side with the cerebrum above and the cerebellum behind. It is divided by tissue into a right and left portion, and the latter is separated by grooves into four columns. When the cerebrum is injured by disease or otherwise, persons become unable to converse intelligently, both from inability to remember words and a loss of power to articulate them. In an idiot this portion of the brain is not well developed. In persons having an injured or diseased cerebellum there is a tendency to totter and walk with uncertain movements as if intoxicated; all their movements and work are irregular and uncontrollable.

Man possesses a large cerebrum in proportion to the weight of the brain, while in lower animals the cerebellum is larger than the cerebrum. The cerebrum seems to be large in order to provide for an emergency in case of injury. Small parts of the human brain have been lost by accident and in war, and, after recovery from the wounds, men suffered little or no impairment of their mental faculties. This is somewhat analogous to an instance in which a person has lost the use of one eye, the other eye supplying him with the sense of sight. Brain force is developed by activity and grows by exercise.

The average weight of the human brain is about forty-five ounces in females and fifty ounces in males. In some notable instances it attained a weight of seventy-five ounces. The brain of an idiotic boy weighed eight ounces, and a female idiot had a brain weighing ten ounces. The brain of Agassiz weighed 54.4 ounces, that of Byron 63.7; Cuvier, 64.5; and Turgeneff, 74.8. The ability of a man does not depend upon the size of the brain so much as upon its quality, but it is known that men of great ability possess large brains, and that the brains of cultured races are much larger than those of savages. The brain being a delicate organ, it is influenced largely by the condition of the body, requires food adapted to its growth and sustenance, and needs the recuperation which results from healthful rest. It is subject to many diseases, which usually prove either decidedly harmful or fatal. They include *brain fever, tumors,* and *inflammation of the brain.*

BRAINERD (brān'ẽrd), county seat of Crow Wing County, Minnesota, about 115 miles southwest of Duluth, on the Northern Pacific and the Minnesota and International railroads. It is surrounded by a rich agricultural country, is a grain and jobbing center, and has modern municipal facilities. The manufactures include flour, machinery, clothing, paper, and earthenware. It has flouring mills and extensive railroad shops. The school system is well established and carries an excellent course of study. It has electric lights, pavements, waterworks, and a fine courthouse. In 1883 it received its charter as a city. Population, 1920, 9,591.

BRAINERD, David, Indian missionary, born at Haddam, Conn., in 1718; died Oct. 9, 1747. His work was among the Indians of New Jersey, Pennsylvania, and Massachusetts. He died at the home of Jonathan Edwards, who wrote his biography.

BRAINTREE (brān'trē), a town of Massachusetts, in Norfolk County, ten miles south of Boston, on the New York, New Haven and Hartford Railroad. It is the seat of Thayer Academy and the Thayer Public Library. The manufactures include cotton goods, boots and shoes, hardware, paper, and machinery. Large granite deposits are worked in the vicinity. The first permanent settlement was made on its site in 1634, and the town was incorporated in 1640. Population, 1905, 6,879; in 1925, 13,193.

BRAKE, a device for retarding or arresting motion by means of friction. In railroad cars and machinery it usually consists of a simple or compound lever, connected with a shoe or band, which is forcibly pressed on the periphery of the wheel that is to be stopped or reduced in its speed. The problem of supplying suitable brakes for railroad and street cars has engaged the attention of inventors for several decades. Hand brakes are now used largely for retarding motion in small machines, while air and electric brakes are common on street and railway cars and in large machinery. In an air brake either the compression or vacuum may be used. In the former the air is compressed by a pump attached to the engine and is conveyed to cylinders under the cars by means of pipes, where it acts on the brake-levers. The vacuum method is the reverse; the air is exhausted from the device beneath the car, and the brake-levers are acted on by atmospheric pressure. The electric brake is used largely on electric railways. It is constructed so the car-motor will become a dynamo as soon as it is disconnected from the trolley wire, and as such it generates a force sufficient to act upon the brake-levers.

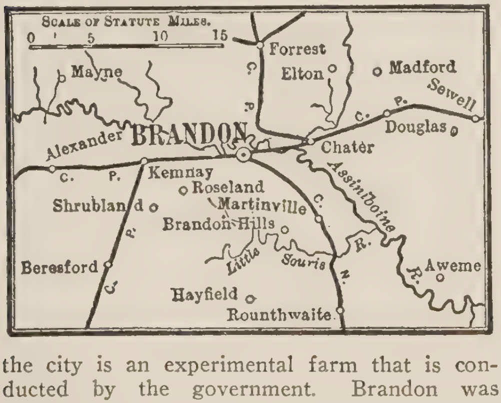
BRAKE, or **Bracken,** a class of ferns found in many parts of America and other continents. It is large and coarse and has a creeping rootstalk, from which naked stalks about fifteen inches high grow up. It grows in rocky regions and on hillsides. The early frosts kill the annual growth, and in the spring new shoots come up from the rootstalk or rhizome, which has a bitter taste and is used to a limited extent as a substitute for hops.

BRAMBLE (brăm'b'l), the name of a kind of blackberry native to Great Britain. This plant is not cultivated for its fruit, which is of a fair quality, because it spreads rapidly and in this respect resembles an obnoxious weed. The word *bramble* is used in America to describe collectively such plants as the blackberry, raspberry, and blueberry.

BRANDENBURG (brăn'den-bŏŏrg), a province and city of Prussia, in the German Republic. The province has an area of 15,383 square miles. It is fertile and farming is conducted with much care. Rye and barley are the chief cereals, and tobacco, fruit, and vegetables are grown. Brown coal is mined extensively, but manufacturing is the leading industry. The chief towns are Kottbus, Potsdam, and Frankfort-on-the-Oder. In 1925 the population was 4,093,007, nearly all of whom were German Protestants. The former ruling family of Germany, the Hohenzollerns, came into the possession of Brandenburg in the 15th century; in 1711 they ascended to the kingly line of Prussia; and in 1871 became the imperial family of Germany. The city of Brandenburg is on the Havel River, thirty-five miles southwest of Berlin. It has extensive factories producing woolens, leather, silk, pottery, machinery, chemicals, and clothing. It is the seat of excellent schools, churches, and higher institutions of learning. The city is a focus of important railroads, has electric lights and street railways, several parks, and a large trade in merchandise. Population, 1905, 51,239; in 1920, 53,595.

BRANDES (brăn'dĕs), **Georg Morris Cohen,** critic and historian, born in Copenhagen, Denmark, Feb. 4, 1842. He descended from a Jewish family. In 1864 he graduated at the University of Copenhagen and soon took up literary work. He settled in Berlin, Germany, but returned to his native country in 1883, and there gave his time principally to writing and lecturing on belles-lettres. His works greatly influenced the ideals and tendencies of Danish literature and gave to it a cosmopolitan aspect. He achieved success as a critic of literary works, and his writings partake of a realistic tendency. His "Main Currents" is in six volumes and comprises a review of the literature of France, England, and Germany. Other works include "French Aesthetics," "Criticisms and Portraits," "Berlin as an Imperial Court," "Impressions of Russia," and "Aesthetic Studies." Several of his writings were in German, and these include "Lord Beaconsfield" and "Ferdinand and Lassalle."

BRANDON (brăn'dŭn), a city of Canada, in Manitoba, 132 miles west of Winnipeg. It is pleasantly situated on the Assiniboine River, on an elevated site, and on the Canadian Pacific and the Canadian National railways. It has a large trade in grain and live stock. The chief buildings include a courthouse, a convent, and a collegiate institute. The manufactures consist of machinery, flour and oatmeal, ale and porter, earthenware, pumps, and clothing. Near the city is an experimental farm that is conducted by the government. Brandon was founded in 1881 and has had a rapid growth, owing to its car shops and its location in a fertile farming country. Population, 1901, 5,620; in 1919, 14,421; 1921, 15,397.



BRANDY (brăn'dy̆), a liquid secured by distilling grape wine, manufactured chiefly in France. Both red and white wines are used. The brandy known as *Cognac* manufactured in the department of Charente is considered the best grade, and was transported to America in large quantities. *Catawba* brandy was made in Ohio from the Catawba grapes, while high grades of other varieties were made on the Pacific Coast, where the vine attains a prolific growth. Brandy is used in medicines, for stimulants and restoratives, and as a beverage. The amount of alcohol contained in brandy depends upon the wine from which it is distilled. Some of the higher classes contain a larger per cent. of alcohol and are expensive; as much as twenty dollars per gallon is paid for genuine cognac. The product formerly made in California was considered equal to the French varieties. The pure quality consists almost entirely of alcohol and water, and is wholly colorless until it is put in kegs, when it takes on the color of wood. *Apple-jack,* a kind of brandy, is made from apple cider, while another variety is made from peach wine.

BRANDYWINE, a small stream in Pennsylvania, passing into the State of Delaware, and flowing into the Christiana Creek at the city of Wilmington. The stream became historic on account of the Battle of Brandywine, which was fought on its banks Sept. 11, 1777, between the British and Americans, in which the latter were defeated. The American forces consisted of 13,000 men under General Washington, and the British of 18,000 under Lord Howe.

BRANT (brănt), **Joseph,** an Indian chief, born in Ohio, in 1742; died near Lake Ontario, Nov. 24, 1807. He accompanied his two elder brothers in a campaign with Sir William Johnson against the French on Lake George. Later he attended the Indian school at Lebanon, Conn., and became skilled as an interpreter. In the Revolutionary War he fought with the British and engaged in many bloody raids against the colonists. In 1777 he took part in the battle of Oriskany, and later raided the Mohawk Valley with 300 Indians and tories. After the war a tract of land was granted to the Indians at his request on the north side of Lake Erie. He became converted to the Christian cause while on a visit to Europe, and raised funds to build a church in Canada, the first Episcopal church erected in the Dominion. He translated a number of works, including the English prayer book and the gospel of Mark, into the Mohawk language. A statue was built in his honor at Brantford, in Ontario. His youngest son, John, was an active participant in the War of 1812.

BRANT (brănt), or **Brandt, Sebastian,** poet and humanist, born in Strassburg, Germany, in 1458; died May 10, 1521. He studied at the University of Basel, where he became professor of philosophy and jurisprudence, and later was appointed an imperial councilor by Emperor Maximilian. His "The Ship of Fools," in which he ridiculed the vices and follies of his time, was translated into Latin and made him famous among the scholars of Europe. An English translation was made by Alexander Barclay in 1509. Brant ranks as an important forerunner of the literature of the Reformation.

BRANTFORD (brănt'fẽrd), a city of Ontario, in Brant County, seventy miles east of London, on surfaced highways and on the Canadian National and the Canadian Pacific railroads. It has a fine location on the Grand River and is surrounded by a fertile farming, dairying, and stock-raising country. It has manufactures of stoneware, machinery, engines, clothing, and flour, and has a brisk trade in farm produce and merchandise. Many of the buildings are of pressed brick and stone, and modern utilities, such as gas and electric lighting, are well patronized. The public buildings include a number of fine schools, and it is the seat of the Ontario Institution for the Education of the Blind and of Wickliffe Hall. The Bell Homestead is located in Brantford, the home of Alexander G. Bell, inventor of the telephone. Population, 1921, 29,440.

BRASS (bràs), an important alloy of zinc and copper. It is hard, ductile, and malleable, and the color is a bright yellow. Formerly it was made from calamine mixed with copper and charcoal. This process is easier than the fusion of copper and zinc. The proportion of copper and zinc varies, but ordinarily from twenty-eight to thirty-four per cent. of zinc is used. It is harder and yet more easily fusible than copper, and is more sonorous. Brass resists the influence of the atmosphere better than copper, but requires a varnish or lacquer to prevent tarnishing, and is readily turned on a lathe, rolled, and stamped.

Brass was used in very ancient times, and is mentioned in the cuneiform writings of the Chaldeans and the Assyrians. In the Middle Ages it was made chiefly in the form of sheets, and was used for household utensils and for a number of purposes in churches. The ancient method of making brass was by heating copper with calamine, a native ore of zinc, and charcoal. James Emmerson patented a process for the direct production of brass from copper and zinc in 1781, and this has superseded the older methods. It consists of first melting the copper in a crucible, then adding small quantities of the zinc, and when the two metals are thoroughly mixed, which is brought about by stirring, the molten brass is cast into molds made of sand or iron. Owing to the volatility of the zinc, considerable of this metal is lost during the operation unless much care is exercised.

One part of zinc and two parts of copper, by weight, is a good working basis in making brass. If the proportion of zinc is increased, the compound loses in tenacity, while an increase of copper adds to its strength and tenacity. When the proportion is one part of zinc to ten of copper, the result is a reddish-yellow brass. If a small per cent. of lead is added to the alloy it diminishes its ductility. The addition of tin increases the hardness of brass. *Tombac* and *pinchbeck* contain eighty parts or more of copper to twenty or less of zinc. *Bristol brass, similör, Mannheim gold,* and *prince's metal* are names used to describe brass made by using different proportions of zinc and copper. In the arts, brass is of importance next to iron and steel. It is used largely in making buttons, pipes of organs, household utensils, and many parts of machinery.

BRASSEY (brăs'ĭ), **Thomas,** contractor and surveyor, born near Chester, England, Oct. 7, 1805; died Dec. 8, 1870. He became a surveyor and railroad contractor. His first contract was made with George Stephenson for a viaduct between Stafford and Wolverhampton. In 1840 he built a railroad from Rouen to Paris, France, and subsequently had large contracts in Australia, America, and Asia. His largest contract was for the construction of the Grand Trunk Railway in Canada, of which line he built 1,100 miles, and constructed the great bridge at Montreal over the Saint Lawrence. He received many decorations, including the cross of the Legion of Honor from France and the Iron Cross from Austria.

BRATTLEBORO (brăt't'l-bŭr-rȯ), a town in Wyndham County, Vermont, on the Connecticut River, about eighty miles southeast of Rutland. It is located on the Vermont Central and the Boston and Maine railroads. The manufactures include furniture, carriages, organs, and machinery. It is the seat of the Vermont Asylum for the Insane and has fine churches and schools. The famous writer, Rudyard Kipling, made Brattleboro his home for some time. Brattleboro was chartered in 1753 and named from William Brattle, one of the original grantees. Population, 1920, 7,324.

BRAZIL (brȧ-zĭl'), county seat of Clay County, Indiana, about fifteen miles east of Terre Haute, on the Chicago and Eastern Illinois and other railroads. It is located in a rich farming country, and near it are productive coal fields. The manufactures include pig iron, terra cotta, boilers, machinery, and pottery. It has a good jobbing trade, a public library, waterworks, and a courthouse and other public buildings. The region was settled in 1856 and it was incorporated in 1873. Population, 1900, 7,786; in 1920, 9,293.

BRAZIL, United States of, the largest country of South America, occupying the eastern and central part of that grand division. It extends from north latitude 5° to south latitude 34°, and from west longitude 35° to 74°. Its extreme length from north to south is 2,665 miles, extreme breadth, 2,688 miles. In extent of territory it is one of the largest political subdivisions, exceeds in area the Commonwealth of Australia, and is somewhat smaller than the United States exclusive of Alaska and the insular possessions. It is bounded on the north and east by Colombia, Venezuela, Guiana, and the Atlantic; while its southern and western boundaries are formed by the Atlantic, Uruguay, Argentina, Paraguay, Bolivia, Peru, and Ecuador. It lies entirely east of the great

Andean system, and touches every South American country except Chile. Area, 3,218,991 square miles.

SURFACE. The surface consists of two great sections, the lowlands known as the Amazon basin and the elevated plateaus of the central and eastern parts. The lowlands comprise the basins of the Amazon and other great rivers, extending from the Tocantins to the Guiana Plateau, which rises gradually toward the north and forms the larger part of the northern boundary, culminating in the Tumuc-Humac Mountains, between Brazil and Guiana, and the Parima Mountains, which lie on the boundary line of Venezuela. The elevated plateaus of the central and western parts are made up largely of the Highlands of Brazil, which have an elevation of from 2,000 to 10,000 feet above the sea, culminating in Mount Itatiaia, west of Rio de Janeiro. These highlands are made up of many ranges, one of which separates the basin of the Paraná from that of the Paraguay, and trends northward between the Tocantins and the São Francisco. The highest of these ranges trends parallel to the coast, which is known as the Serra do Mar south of Rio de Janeiro, and as Serra do Espinhaco north of that city. Brazil has a coast line of about 4,000 miles. The coast south of Cape Saint Roque is more or less broken and furnishes good harbors, while north of that point it is comparatively low with an extensive coast plain. The surface contains more fertile land than is found in any other country, most of which is in the basin of the Paraná and the Amazon. Marshes and swamps characterize different sections of the country, especially the valley of the Paraguay and of the regions in the lower valley of the Amazon.

DRAINAGE. The Amazon and the Tocantins drain more than two-thirds of Brazil. About one-fourth of the drainage is by the Paraná, the Paraguay, and the Rio de la Plata, and the remainder is carried by the São Francisco and smaller streams. The Amazon, which is formed by the union of streams that rise in the Andean Mountains, has a general easterly course toward the Atlantic, and receives a large number of important tributaries. These include, besides the Tocantins, which joins it in one branch of the delta, the Purus, Javari, Juruá, Madeira, Tapajos, and Xingú from the south, and the Iça, Yupurá, and Negro from the north. This river system has a length of about 19,000 miles, and the navigable distance is placed at 13,000 miles. Near the delta the basin is narrow, not more than about 150 miles wide, but it expands inland and occupies all of the northeastern part of Brazil. The São Francisco and a number of smaller streams drain the eastern section, and the southern part is drained by the Paraguay, Paraná, Iguassu, and Uruguay rivers. These rivers are of more than passing importance in the commerce of the country, chiefly for the reason that they furnish the only means of transportation in the vast interior.

CLIMATE. The tropic of Capricorn passes on a line drawn a short distance south of Rio de Janiero, hence Brazil lies almost entirely within the tropics. Rainfall is abundant in all parts of the country, ranging from seventy to one hundred inches annually. It is distributed quite uniformly in all sections, but is greatest in the valley of the Amazon. Two seasons, the wet and the dry, alternate each other, the greatest amount of precipitation extending between January and June. The seasons are influenced by the movement of the trade winds, which follow the sun from north to south, and depend somewhat upon the character and elevation of the surface. Near the mouth of the Amazon, particularly toward the south, and in some parts of the plateau region, the rainfall is limited, especially between the Paraná and the São Francisco. The climate is quite even throughout the year. The maximum temperature is 95°, and in most places does not fall below 70°, except in the higher altitudes, where it ranges from 30° to 90°.

MINERALS. All the important minerals are found in Brazil, and it is probably the richest country in this respect. The gold deposits are chiefly in Bahia and Minas Geraes, and these two states have the largest interests in mining this mineral and in the output of diamonds. Iron ore is found in many sections of the Brazilian Highlands and in the mountains of the Guiana Plateau, but little progress has been made in mining this ore on account of a scarcity of cheap fuel and labor. Santa Catherina and Rio Grande do Sul have extensive deposits of bituminous coal and a good grade of lignite is found in many sections, but mining has not been developed to any considerable extent. Other deposits include silver, copper, zinc, rock salt, and kaolin. Many mineral springs and deposits of gas and petroleum abound.

MANUFACTURING. Brazil has not taken a foremost position among the nations in the output of its manufacturing enterprises, chiefly for the reason that it is not densely populated and consequently lacks both in labor and capital. However, the vast natural resources and a steady growth in agriculture are rapidly directing attention to this enterprise. The textile industry is the most important, and includes the spinning and weaving of cotton and wool. The cotton and woolen mills are located chiefly in the states of Minas Geraes, Rio de Janeiro, and São Paulo. Next in importance is sugar refining, which is developed to the greatest extent in the states of Bahia and Pernambuco. Shipbuilding is an important enterprise at Rio de Janeiro and a number of other seaports. Cigar making and the manufacture of rum and other spirituous liquors are important industries. Leather is made in large quantities. Other manufactures include matches, soap, clothing, machinery, and straw hats.

AGRICULTURE. The valley of the Amazon is the most fertile region and contains the largest forests in the world, but many parts of it are covered with dense tropical vegetation. This accounts largely for the section not being developed for farming. However, it is important for its timber, which yields vast quantities of dyewood, rubber, nuts, and lumber.

Farming is developed most extensively in the southeastern part, in the states of São Paulo, Bahia, Minas Geraes, and Rio de Janeiro. In this section are large coffee plantations, and in the production of coffee Brazil takes first rank. Sugar cane is cultivated profitably in these states and in Pernambuco, and cotton is grown in all of the Atlantic states. Tobacco is grown largely, especially in Bahia, and rice and maize are cultivated extensively in São Paulo and Minas Geraes. The smaller cereals are not cultivated extensively in this section, but experiments made in the higher altitudes have demonstrated that they may be grown profitably. Other products include potatoes, beans, yams, vegetables, and Paraguay tea. All the domestic animals reared in North America thrive, but attention is given chiefly to the rearing of cattle and breeding of horses.

FLORA AND FAUNA. The flora is tropical and may be classified according to three zones, that of the southeastern plateau, that of the lower Amazon basin, and that of the west central section. The plants in the southeastern part, near the tropic of Capricorn, are numerous and luxuriant, but somewhat farther northwest the rainfall diminishes and the region is diversified by open country and small forests. In the lower Amazon basin the vegetation is most luxuriant, and includes a large variety of grasses, vines, and forest trees. Here thrive the mangoes, mangroves, palms, silk-cotton tree, rosewood, cinnamon, Brazil nut tree, and the *seringa* or rubber tree. The eucalyptus, which has been introduced from Australia, thrives in this section. Vegetation in the southwestern part is smaller and the number of plants are fewer, owing to a somewhat scant rainfall, but the prairies are covered with nutritious grasses and contain scattered groves of trees.

Many animals abound in the forests and on the plains. The larger animals include the puma, ocelot, jaguar, and tapir. Monkeys are very abundant in the selvas, and deer abound in the southwestern region. Ant-eaters, armadillos, sloths, opossums, and peccaries are plentiful. The boa, jararaca, and rattlesnake are among the reptiles. The Atlantic coast and the larger streams are rich in fish, and the varieties exceed those of any other country. Birds of plumage and song abound in all sections, but they are especially numerous in the forests.

TRANSPORTATION. The railroads are regulated by law and about two-thirds are owned by the government. They include lines that aggregate 15,000 miles and many lines have been projected. Nearly all of the railroads are near the Atlantic coast, in the southeastern part, and the vast interior is entirely destitute of railways. However, shipping is facilitated by navigation on its extensive systems of rivers, a number of which have been improved by constructing canals and removing obstructions. The government has encouraged shipbuilding by appropriations, hence an excellent merchant marine has been built up, but the vessels take care of domestic commerce rather than foreign trade, which is carried largely by the vessels of other countries. Telegraph and telephone lines connect the larger cities, but these facilities are practically unknown in the remote interior.

The exports greatly exceed the imports, and the total foreign trade annually has a value of $490,500,000. The United States has the largest share of the trade. Next are England, Germany, and France, in the order named. Coffee is the most important article of commerce and constitutes about sixty per cent. of the total exports. About two-thirds of it is exported to the United States and the balance to Europe. Sugar ranks next to coffee in value as an article of export. Other exports include rubber, cotton, tobacco, hides, lumber, drugs, dyewoods, and minerals. The imports consist chiefly of machinery, cotton and woolen fabrics, flour, breadstuffs, wine, corn, and chemicals.

EDUCATION. Public education is regarded with deep concern by the people, but is still in a very primitive state, and about seventy-five per cent. are unable to read and write. The school system includes three classes: the primary, secondary, and superior. Higher education is controlled by the state and general governments, while the other institutions of learning are under local control and supervision. The higher schools include colleges and universities devoted to medicine and law, and to the industrial, naval, and military arts. Several normal schools are maintained for the training of teachers in the fundamental elements of their profession. Some of the states have compulsory attendance laws, but they are not enforced, while in others attendance is voluntary. The language of the country and that taught in the schools is the Portuguese.

GOVERNMENT. Brazil is a republic and for the purpose of government is divided into twenty states and a federal district. The constitution vests the chief executive authority in a president, who is elected for a term of four years by popular vote. He is assisted by a cabinet of six ministers, who preside over the departments of war; finance; industry, railroads and public works; navy; interior and justice; and foreign affairs. The legislative power is in a congress composed of a senate and a chamber of deputies. Each state has three senators, making a total of sixty members, who are elected by direct vote for nine years, one-third being elected every three years.

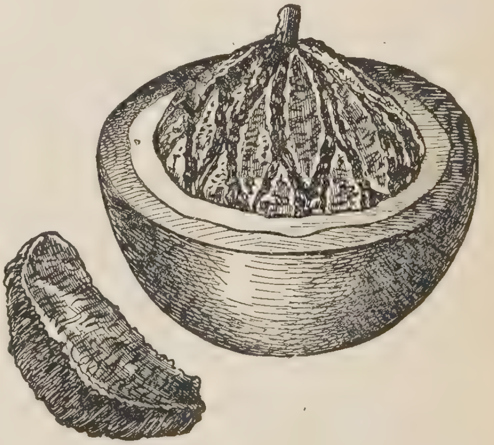
Representation in the chamber of deputies is based upon the population of the several states, and the members are chosen by popular vote for four years. The system of courts culminates in the national supreme court, which is the highest judicial authority. Each state maintains its own executive, legislative, and judicial authority, and for the purpose of local government is divided into *municipalities* and *districts.*

INHABITANTS. The population of Brazil is greater than that of any country in America except the United States, but the average density is only 4.5 persons to the square mile. About one-half of the people are whites, one-third half-breeds, and the balance Negroes and Indians. Immigration has been encouraged by the government, which sold the land at prices ranging from $1.00 to $2.00 per acre, payment to be made in about seven years. The largest number of immigrants come from Germany and Italy, and it is due to this influx of Europeans that Brazil is gaining in national strength. About ninety per cent. of the people are Roman Catholics, but the church and state are entirely separated and all faiths are tolerated. Rio de Janeiro, the capital, is the most important financial and commercial center. Other cities of importance are Bahia, São Paulo, Santos, Pernambuco, Pará, Campos, Belem, Maranhão, Ceará, and Pelotas. The total population of Brazil in 1921 was 30,524,204.

HISTORY. Brazil was discovered in 1500 by Vicente Yañez and Pinzón, who landed at Cape Saint Augustine and explored the coast north to the Orinoco River. Two Portuguese expeditions were sent to explore the coast and plant colonies as early as 1501 and 1503. However, the settlement of Brazil was not decided upon until 1530, when grants were given to individuals who received power to establish colonies and develop trade. Many of the early attempts failed on account of contact with the Indian natives, who were decidedly unfriendly to the settlements of the whites. A colony was established on the Bay of Rio de Janeiro in 1567. The royal family of Portugal, the house of Braganza, was expelled from Portugal by the French in 1808 and took refuge in Brazil, under whose guidance the country enjoyed marked prosperity in commerce and internal improvements. The eldest son of the king declared Brazil independent of Portugal and was crowned emperor as Dom Pedro I. in 1822.

The discovery of gold and diamonds early in the 18th century led to a number of settlements and these minerals soon became a source of profit. This proved an effective incentive to immigration from Europe, especially from Portugal and Spain, and the government began to develop greater stability. Not long after the adoption of a constitution in 1824, serious international complications arose, but Portugal, although losing its largest and most productive colonial possession, formerly recognized the independence of Brazil. Later opposition arose to the reign of Dom Pedro I., and he voluntarily abdicated in 1831 in favor of his eldest son and returned to Portugal. The government was administered by regencies for the next nine years, when a popular agitation led to the declaration of the young prince's majority, then fifteen years of age, and his coronation as Dom Pedro II. He reigned successfully for forty-eight years, when a revolution broke out and he was dethroned on Nov. 15, 1889, when the country became a republic. It declared war against Germany in 1917.

BRAZIL NUT, or **Cream-Nut,** the seed of the *Bertholletia excelsa,* a beautiful tree native to the northern part of South America. The tree grows to a height of 120 feet and is valuable both for its seeds and the wood it yields, which is known as brazil wood. The seeds grow within a woody pericarp, or seed vessel, and vary in number from fifteen to twenty. They are popularly called nuts and are sold on the market by the popular name of *Niggertoes.* The nuts are triangular in form, and within the hard shell is a white kernel, which is very agreeable to the taste. It yields a large per cent. of oil, which is used for burning in lamps by the natives. Large quantities of Brazil nuts are exported from Pará and French Guiana to the markets of Europe and America.



BRAZIL NUT.

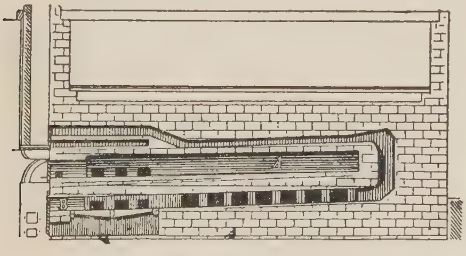
BRAZIL WOOD, a kind of wood derived from several trees native to the tropical regions of the Western Hemisphere, and exported largely from Brazil and the West Indies. A number of grades are known in commerce, such as *Lima wood, Pernambuco, Santa Martha, Sapan,* and *All Saints,* the names indicating products of different value. Brazil wood is yellow when newly cut, but when exposed to air it becomes red, and as a dyestuff is exported after being ground down to the size of sawdust. It is a heavy, hard wood, and is used in cabinet making. The coloring matter is obtained by weathering the ground wood, then boiling it in water or alcohol, when it yields its coloring matter known as *brazilin.* It is used in making red ink and in calico printing.

BRAZOS (brä'zôs), the largest river located wholly in Texas. It rises in the northwestern part, has a southeasterly direction, and flows into the Gulf of Mexico. It is 940 miles in length, of which over 200 miles are navigable in the rainy season, from February till May.

BRAZZA (brät'sȧ), an island in the Adriatic Sea, belonging to Austria-Hungary. It has an area of 150 square miles and is diversified by mountains and valleys. The soil is generally fertile and produces grain and fruit. Marble quarries are worked profitably. For the purpose of government it is annexed to Dalmatia. San Pietro, the chief town, has 3,500 inhabitants. The island has a population of 24,465.

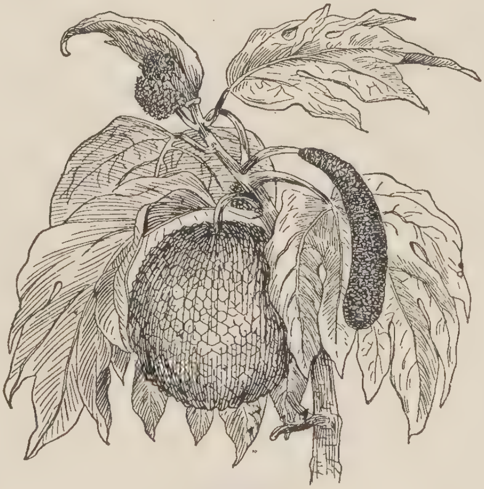
BRAZZA, Pierre Savorgnan de, explorer, born in Rome, Italy, Jan. 26, 1852; died Sept. 14, 1905. He came from a noble family of Italy, but received his education in the schools of France. In 1875 he entered the French navy and the following year went on an expedition of discovery to Africa. He explored the Ogowe River and several streams flowing into the Congo, and in 1879 reached Brazzaville on Stanley Pool before Stanley visited that section. In 1882 he returned to Europe, but soon went back to Africa as lieutenant commander, and in 1885 was made governor of the entire French Congo. He was reappointed governor in 1891. To him France owes her possessions in West Central Africa.

BREAD, an article of food made of the flour or meal of grain, especially wheat and rye. The flour is mixed with water or milk and salt so as to form a consistent paste known as *dough,* and it is then baked in an oven. Bread is either *leavened* or *unleavened,* depending upon the ingredients used. Leavened bread is made by mixing the dough with yeast or baking powder to produce fermentation and rising, or lightness, and the mixture is kneaded twice, once at the time of mixing and a second time after the first rising, and it is then made into the form of biscuits or loaves, which are given a brief time to rise before baking. Unleavened bread is heavy and compact, since it is made by using only flour and water, but it has the advantage of keeping longer, therefore is used more generally by those who cannot secure leavened bread regularly. However, leavened bread is used generally.



OVEN FOR BAKING.
A, receptacle for loaves; *B*, fire-box.

A light and porous unleavened bread is made by using an acid and a carbonate of ammonia, or a carbonate of soda. The carbonate is driven off by the heat in the process of baking. This is known generally as *aërated bread* and is used extensively in London and other cities of England. *Whole-wheat bread* is made by using unsifted ground wheat. It is the true *Graham bread* is more nutritious than white bread, as it contains about fourteen per cent. of nitrogenous matter, while white bread contains only about seven per cent. An excellent bread is made of rye, and this kind is a popular food in many countries of Europe, while in others rice, corn meal, potatoes, and beans are utilized in the production of bread. It may be said that the temperature of a country is an important factor in determining the kind of bread eaten. Barley, rye, and oats are used most extensively in the colder regions, wheat and maize in the temperate portions, and rice and millet in the hotter countries. The principal adulterations of bread are made by the addition of a cheaper flour, such as adding that of rice and beans to the flour of wheat. They are harmless, but add weight and diminish the cost of production.



BREADFRUIT.

Grinding grain and baking bread, both leavened and unleavened, have come down to us from remote antiquity. The ancient Egyptians and Assyrians were skilled in these arts. It is thought that the Greeks and Jews learned how to make leavened bread from the Egyptians, and after the rise of Rome this knowledge was carried to the nations of Central and Western Europe. The yeast now used is constituted mainly of the minute cells of a fungous plant and multiplies by budding. It was used in making beer before it became known as a valuable requisite in making bread. When brought in contact with water and flour, it develops alcohol and carbon dioxide, and the former passes off in the process of baking, while the latter is retained in the dough. Bread becomes light and porous from the amount of gas which acts to distend it, and when the dough is sticky and does not allow the gas to escape the bread becomes heavy. Since 1858 machinery has been used extensively in bread making, and in the course of time caused it to develop into one of the most important enterprises. Most of the bread now consumed in large cities is made in bakeries, and is delivered direct to the customers. Some people in the country still bake their own supply, which consists largely of leavened bread and light biscuits.

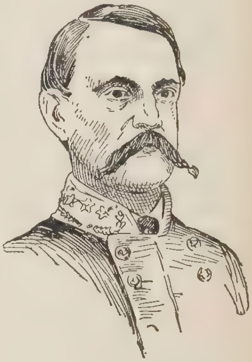
BREADFRUIT, the large fruit of the breadfruit tree. It attains a globular form, about the size of a child's head, and is used largely for food. It is baked, stewed, roasted, or fried in palm oil. The eatable part lies between the hard outer skin and the core. When baked, it is white and about the same consistency as wheat bread. The tree is cultivated in the West Indies and the South Sea Islands. It attains a height of forty feet. The wood is valuable for building and the bark yields material for cloth.

BREADNUT, the fruit of a tree closely allied to the breadfruit, native of Jamaica. It has evergreen leaves and yields a gummy milk. The fruit is a one-seeded drupe, which is edible, and forms an agreeable article of food after being boiled or roasted. It has the taste of hazelnuts and is eaten as bread. The wood of the tree is used in veneering.

BREAKWATER (brāk'wạ-tẽr), a wall, mole, pier, or some similar structure placed at the entrance of a harbor with a view of deadening the force of the waves which roll in from the ocean. Breakwaters are variously constructed of floating bridges, made of wood, brick, stone, and iron, or suspended from chains, and of solid walls or mounds built up from the bottom of the water, with stone inclosing large blocks of concrete. Among the notable breakwaters in the Great Lakes is the one at Chicago, protecting the harbor of the city against the waves of Lake Michigan. It is built on a solid stone basis and incased with wooden beams. Another solid structure is at Buffalo, on Lake Erie, another at Cleveland, and a third in Delaware Bay. Among the most noteworthy in Europe are those at Cherbourg, France, and Plymouth, England. The one at Cherbourg was proposed by M. de Cessart to the French government, and is the largest and most expensive ever constructed. It was completed by Napoleon III. at a cost of nearly $3,000,000. The ancient Romans constructed several breakwaters at Italian ports, and other similar structures were made very early in history. In some places they serve for fortifications and residences. In most cases they are constructed from one to five miles from the shore, this depending upon the depth of the water and the conditions surrounding the city or harbor to be protected.

BRÈCHE-DE-ROLAND (brâsh'de-rô-län'), a pass in the Pyrenees, between Spain and France, located a short distance west of Mont Perdu. It was so named from Roland, who, according to a legend, opened the rock with his sword Durandal so the army of Charlemagne could pass through. The defile is about 200 feet wide and is bordered by rocks that rise almost perpendicularly on both sides.

BRECKENRIDGE (brĕk'en-rĭj), **John Cabell,** statesman and soldier, born near Lexington, Ky., Jan. 21, 1821; died May 17, 1875. He was educated at Center College, Danville, and at the Transylvania Institute, and entered upon the practice of law at Lexington. He served in the war with Mexico, and was sent to the State Legislature and to Congress after its close. In 1854 he was elected Vice President with Buchanan, and at the close of the administration was a prominent candidate of the Democratic party for President. The party being divided, he was nominated by the southern Democrats and received seventy-two votes in the electoral college. He entered the United States Senate in 1861 and defended the Confederate cause in that body. He joined the Confederate army and took part in the battles of Shiloh, Baton Rouge, Murfreesboro, Chickamauga, Chattanooga, and Cold Harbor, and rose to the rank of major general. In 1865 he became secretary of war for the Confederacy. At the time of his election to the Vice Presidency he was thirty-five years old, the youngest official ever elected to that office. The Breckenridge family is one of the most historical in America, and includes, among other prominent members, Clifton R. Breckenridge (born 1846), statesman; John Breckenridge (1797-1841), clergyman; Robert Jefferson Breckenridge (1800-71), clergyman, and William C. P. Breckenridge (q. v.).


JOHN CABELL BRECKENRIDGE.

BRECKENRIDGE, William Campbell Preston, statesman and orator, born at Baltimore, Md., Aug. 28, 1837; died Nov. 19, 1904. He studied at Center College, Danville, Ky., where he graduated in 1855, and subsequently took a course in law at the University of Louisville. He was professor of equity jurisprudence in Cumberland University, Lebanon, Tenn., and served efficiently in the Confederate army during the Civil War. In 1884 he was elected to Congress as a Democrat and served consecutively until 1895, when he was defeated for reëlection.

BREDA (brå-dä′), a city of Holland, in the province of North Brabant, at the confluence of the Aa and Mark rivers. It has railroad facilities and an important trade. Among the manufactures are cigars, clothing, carpets, and machinery. Formerly it was strongly fortified, but the fortifications were dismantled several centuries ago. In 1566 it was the meeting place of the Dutch nobles, who drew up the "Compromise of Breda," which was presented to the King of Spain. Population, 1906, 27,644; in 1919, 27,976.

BREECH-LOADING GUNS (brēch′-lōd′-ĭng), a term applied to firearms in which the charge is introduced at the rear end of the barrel instead of the muzzle. The mechanism is so constructed that the breech can be opened and closed for the purpose of receiving the charge. This gives a decided advantage in small arms for cleaning and rapid firing. While the use of this class of guns dates back to the 16th century, the general introduction of them is quite recent. The efficiency of these firearms for military use was demonstrated in 1864 and 1866 in the Prussian campaigns against Denmark and Austria, and they contributed largely to the victories of the German army in 1870-71. The Prussian gun (Zündnadelgewehr) has been superseded by the Mauser, a needle gun with metallic cartridges on much the same principle. There are now many kinds of breech-loading guns, both for the purpose of hunting and for military use. Germany and most of the nations use the Mauser; England, the Lee-Metford; Austria and Brazil the Mannlicher; and the United States, the Krag-Jörgensen.

BREEDING, the art of continuing or improving breeds of domestic animals by continuous care in feeding and pairing. All animals and plants are susceptible to modification under systematic cultivation. This fact has been turned to advantage by combining in individual specimens a number of good qualities found in several different kinds of original stock. The principles taken advantage of are those of heredity, variability, selection, and crossing. The germs of all that is desired must be found in the specimen to be improved, and the process must be by slow development during long periods of time, else an essential loss will occur in some line at the expense of the higher qualities desired. Breeding for the improvement of all kinds of domestic animals has shown excellent results since the beginning of the last century, although considerable attention was paid to horse breeding from remote periods. The production of increased yields in quantity and fineness of wool in sheep, and beef and milk in cattle, is especially marked, while breeding in swine has largely increased the annual returns to farmers. One important principle to be observed is that the best results are produced between animals comparably similar, changing the breed gradually to the higher quality.

BREMEN (brĕm′en), an important free city in Germany, on the Weser River, about fifty miles from its mouth. The free district has an area of ninety-nine square miles, and, besides the city, includes Bremerhaven, a port on the estuary of the Weser. The port has wet and dry docks, an excellent harbor, and a hospitium for emigrants; population, 23,991. Bremen is one of the most important and historic cities of Europe. It was made a bishopric in the year 788 by Charlemagne, and was for some time a member of the Hanseatic league of cities. The government is by a senate and a council, under a constitution which is republican in form. Bremen is the principal seat of the German export and import trade, and the most important port for emigrants. Its foreign commerce extends to all the countries of the world, including a large trade with the United States. The imports aggregate about $95,500,000 worth of commodities, while its exports are correspondingly large. The manufactures include sugar, tobacco products, ironware, machinery, pottery, fabrics, chemicals, cordage, steamboats, and engines. Among the chief buildings are a Gothic council house, the town hall, the merchants' house, the exchange buildings, and a cathedral founded in 1050. The school system is open to free admission and the attendance is compulsory. The public schools carry courses which range from the kindergarten to the high school, and the instruction is closely articulated with that given in the gymnasiums and trade schools. It has a large public library, many well kept promenades, two extensive parks, and modern harbor and wharf improvements. The city is a focus of many railroads and canals. Telephone and telegraph lines connect it extensively, and it is finely paved and beautified by statuary, electric lighting, and equestrian fountains. Intercommunication is by a system of electric railways, with branches to Bremenhaven and many inland points. Population, 1920, (city) 246,827; (state) 298,736.

BREMER (brē′mēr), **Fredrika,** Swedish novelist, born near Åbo, Finland, Aug. 17, 1801; died Dec. 31, 1865. When a child of eight years, she began to write verses and study the poetic works of Schiller. Her reputation rests on novels that were translated into German, French, and English. The most important include "The Neighbors," "The President's Daughter," "Brothers and Sisters," "The Midnight Sun," and "Homes in the New World." Several of her works were translated by Mary Howitt. Her novels appeared under the general title

"Teckningar ur Hvardagslifvet." A collected edition of her works in thirty volumes was published in the German in 1864.

BRENHAM (brĕn'am), county seat of Washington County, Texas, in the south central part of the State, on the Houston and Texas Central and the Gulf, Colorado and Santa Fé railroads. It is surrounded by a fertile grain and cotton country, and is an important business and shipping center. The chief buildings include the courthouse, the public library, the Blim Memorial College, and the Evangelical College. Among the manufactures are cotton products, ironware, machinery, and furniture. It was first settled in 1844, and was incorporated in 1866. Population, 1900, 5,968; in 1920, 5,066.

BRESCIA (brā̇'shē̇-ȧ), a city in northern Italy, capital of a province of the same name, about 150 miles from Turin, with which it is connected by railroads. The manufactures include silk and linen textiles, machinery, pottery, and firearms. The surrounding country produces considerable quantities of raw silk, fruits, and cereals. Brescia is noted for its fine churches and cathedral, and contains several botanical gardens, hospitals, museum of antiquities, a theater, and an extensive public library. It is mentioned in history as early as 15 B. C., when it became a Roman colony. Charlemagne captured it in 774, and it was long a possession of Germany. In 1859 it was ceded to Sardinia and the following year was united with Italy. Population, 1921, 70,614.

BRESLAU (brĕs'lou), a city in Germany, capital of Prussian Silesia, at the junction of the Ohlau and the Oder rivers. It is one of the largest cities in the German Empire, containing a growing population and varied industries. A number of handsome bridges across the Oder connect the two parts of the city. It is joined to the marts of trade by several canals and railroads, and has an extensive urban and interurban system of electric railways. The municipal facilities include a public library, waterworks, stone and asphalt paving, and systems of gas and electric lighting.

Breslau is the seat of a university founded by Leopold I. in 1702, which is attended by 1,750 students. The institution has a library of 350,000 volumes, and carries courses of study in all the higher branches, which are taken advantage of by students from remote countries. It has a large number of magnificent churches, among them the Protestant church dedicated to Saint Elizabeth, with a steeple 364 feet high and a splendid organ. While the city contains a number of old parts, it has been largely affected by modern trade, and has responded liberally to the demands of modern culture and architecture. It has manufactures of woolen, silk, linen, and cotton goods, jewelry, machinery, lace, earthenware, soap, firearms, and various other staple products. Its commerce in flax, timber, hemp, metals, corn, and coal is very extensive. While the city is German in language and government, it is of Polish origin and was long occupied by Poles and Bohemians. It afterwards passed to Austria, and was conquered by Frederick II. of Prussia in 1741. It has been frequently besieged and was the scene of many fierce battles. At present it ranks as one of the most important cities of Europe from the standpoint of manufacture and commerce, as well as for educational advancement. Population, 1905, 470,904; in 1920, 511,891.

BREST (brĕst), a seaport city of France, in the department of Finistère, 385 miles west of Paris. It occupies a fine site on the Bay of Brest, at the mouth of the Penfeld River, and is connected by railways with the leading cities of the country. Its harbor is one of the best in France and it is an important marine station. It has large manufacturing and trading interests. In 1914 and subsequently it became important as a depot for supplies and a landing place for soldiers from America. A cable line connects it with America, near Duxbury, Mass. Population, 1921, 91,450.

BREST-LITOVSK (brĕst-lē-tŏ̇fsk'), a city of Russia, in the government of Grodno, at the junction of the Bug and the Mukhavetz rivers. It is a first-class fortress and has a large trade. In 1795 it was transferred from Poland to Russia. The inhabitants are largely Poles, Russians and Germans. The Germans captured it in 1915, and it was made the seat of the peace conferences between the Central Powers and Russia in 1917. Population, 1923, 52,580.

BRETON (brā̇-tō̇n'), **Jules Adolphe**, painter, born in Courrières, France, May 1, 1827. He was educated at Saint Omer and at Douai, and instructed in art at Ghent and Paris. His paintings are devoted mostly to peasant life, and are seen in many galleries of Europe and America. Among the most popular are "Return of the Harvesters," "The Gleaners," "Blessings of the Harvest," "Recall of the Gleaners," "Evening in a Hamlet of Finisterre," and "The Communicants." He died July 5, 1906.

BREVIARY (brē'vĭ-ā̇-ry̆), the book which contains the ordinary and daily services of the Roman Catholic Church. The contents of the Breviary include all of the service except those for funerals, baptisms, and other special occasions, which are in the Ritual or Pontifical, and those used in the celebration of the Eucharist, which are in the Missal. The clergy and all choir members are obliged to recite the service for the canonical hours every day. It is divided into separate parts for winter, spring, summer, and autumn.

BREWER (brṳ'ẽr), **David Josiah**, American jurist, born in Asia Minor, June 20, 1837. His father was an American missionary and sent him to Yale, where he graduated in 1856. Two years later he graduated from the Albany Law School, and entered the law practice at Leavenworth, Kan., where he was elected probate judge in 1862, and two years later district judge. In 1870 he was elected to the supreme bench of Kansas, and was reëlected in 1876 and 1882. He resigned in 1884 to become a United States circuit judge, and in 1889 was appointed by President Harrison to the Supreme Court of the United States as successor to Stanley Matthews. He died Mar. 28, 1910.

BREWING (bru̥'ing), the art of making malt liquor. The term is applied to the extracting of wort or any saccharine substance from grain. In making beer, three raw materials are used, that is, hops, barley, and water. The first process is known as *malting,* which consists of causing the grain to germinate so the starch is changed into sugar. It consists of *steeping* the barley three or four days, during which time it absorbs some of the water and begins to swell and soften. It is then spread to a depth of about one foot in the malthouse, where it germinates and throws out sprouts. After about ten or twelve days it is taken to the dry kiln, where it is heated to a temperature of 90° to 150°, depending upon the kind of liquor desired, pale beer requiring the minimum and brown beer the maximum temperature. When the malted grain is fully dried and crisp, it is in a condition for brewing.

The next step is to pass the malted grain between two rollers so as to bruise or crush it, when it is known as *grist.* In this form it is put in the malt tub and mixed with water heated to 170°. It is constantly stirred with mechanical mixers and in this stage is known as *mash.* It requires three or four hours to complete the process, after which the liquid, now known as *wort,* is drained off and run into vats containing the yeast, in which fermentation (q. v.) takes place.

In the United States the brewing business was one of the chief sources of revenue, paying as an internal tax $35,500,000 to the general government. Its sale was also taxed by many of the states and cities. Over 60,000 men were employed directly as laborers in brewing, and many thousands were engaged in the wholesale and retail trade. There has been a contention for many years regarding the liquor question. In some states it was long the principal political issue between the parties. With the adoption of improvements in manufacture, as the use of sterilized water, filtered air, and artificial refrigeration, beer is made free from bacteria and injurious organisms, and is greatly less perishable. Pasteur made several discoveries in scientific brewing. He was among the first to announce why beer, like the lip that quaffs it, is subject to disease. See **Beer; Bacteriology.**

BREWSTER (bro͞o'stẽr), **Sir David,** noted physicist, born at Jedburgh, Scotland, Dec. 11, 1781; died Feb. 10, 1868. He was first attracted to the study of physics by the lectures of Playfair and Robson. In 1807 he was granted a degree at Cambridge and later at Aberdeen, and was made a member of the Royal Society of Edinburgh. He became the editor of the *Edinburgh Magazine* in 1808 and the founder of several scientific journals. Among his principal books are "Letters on Natural Magic," More Worlds than One," "Treatise on the Kaleidoscope," "Life of Newton," and "Martyrs of Science."

BREWSTER, William, pioneer, born at Scroovy, England, in 1560; died April 10, 1644. He studied at Cambridge University and entered the public service. For a time he was Secretary of State to Queen Elizabeth, with whom he visited in Holland. On returning to England he left the established church and was imprisoned in 1607. He came to America on the first voyage made by the *Mayflower.* His descendants include many esteemed families of New England.

BRIAND, Aristide, statesman, born in France in 1863. He became a successful advocate and publicist, was chosen superintendent of public instruction in 1906, and in 1909 became prime minister, although a socialist. He resigned in 1911, owing to economic difficulties, but continued to be a potent public factor, and in 1925 was chosen premier the ninth time. In 1928 he actively promoted the Kellogg-Briand Treaty, which has for its purpose the outlawry of war.

BRIBERY (brīb'ẽr-ȳ), a reward or valuable consideration given or accepted by any one with a view of unlawfully influencing judgment or conduct in a public office or some other capacity. This definition is the one usually applied at present, and includes alike the giver and the receiver, both being considered equally guilty on conviction. The charge of bribery is sometimes alleged against candidates for office, voters, and members of legislative bodies. Legislation with suitable penalties has been directed against it. It is a crime even if the party accepting the bribe does not pursue the course agreed upon. Officers of the general government may be removed from office on conviction of bribery.

BRICE (brīs), **Calvin Steward,** statesman, born at Denmark, Ohio, Sept. 14, 1845; died Dec. 15, 1898. In 1857 he entered Miami University and graduated in 1863, after serving in the Civil War. He reëntered the army as captain in the Ohio volunteer corps and remained in active service until 1865. He studied law at the University of Michigan, and was admitted to practice in the United States court in Cincinnati in 1866. In 1888 he was prominent as chairman of the national Democratic committee, a position he filled creditably, and was elected to the United States Senate the following year.

BRICK, a molded and burned block of clay, forming a species of artificial stone. The name is also applied to the unfinished product when in a molded plastic state, or when it has been dried and repressed, before being burned. Brick were made at remote periods of antiquity by the Egyptians, Babylonians, Assyrians, and other people of ancient history. They mixed sand and straw with the clay and baked the brick in the sun. When made in this way they are known as *adobe* brick. In cold countries freezing would soon dissolve these brick, but they are valuable in warm and dry climates, and some of them have been preserved for more than three thousand years. Many contain written characters, especially those of Babylon, to indicate the name of the reigning king, and are of priceless value in conveying historic facts to the present age. Brickmaking was introduced in Western Europe by the Romans in the year 44 A. D., and in England by the Anglo-Saxons under King Alfred, in 886. In the time of Henry VIII. and Queen Elizabeth the manufacture became vastly important, the product entering largely into the construction of forts and public edifices. Kiln-baked brick are found in the larger ruins of ancient Babylon, where they were used to face or bind together walls of sun-dressed brick in a manner quite similar to the plan of constructing buildings with hard and soft brick at the present time. However, it appears that the kiln was not used much before the time of the higher Babylonian civilization. The people of Holland have long ranked as skilled manufacturers of brick. In the early history of New York they brought large quantities of their product to America, many of which may still be found in the older part of New York City.

Various clays are used in brickmaking. They consist chiefly of silicates, the simplest, and are known as *fire clays*, of which *fire brick* are made. Clays that contain iron burn red, while those containing no iron appear white, although the brick commonly manufactured vary greatly in color. Fire brick are made from clay that contains little material which burns easily. The size of brick varies on account of the different clays used and the amount of heat applied in burning; those subjected to intense heat shrink somewhat. The usual size employed in building is about eight inches long, four inches wide, and two and one-half inches thick, while sidewalk brick are sometimes made eight inches square and two and one-half inches thick.

In making brick it is best to dig the clay in autumn and expose it to the influence of the rain and frost in order to break it up easily. It should be worked over a number of times and the brick may be molded and burned the following spring. On a small scale brick are made by hand, but for larger productions large machinery is used. The clay is mixed with sand and thoroughly worked in a pug mill, after which the material is put into molds and placed in a drying shed or in the sun. They are taken to the kiln to be burned when dry, which usually takes place in from eight to ten days. The kilns have flues or cavities for the insertion of fuel, and spaces for the passage of the fire and hot air to penetrate the brick stacked in regular order within. The burning is done by gas, wood, or coal, and varies from a few days to two weeks according to the method employed.

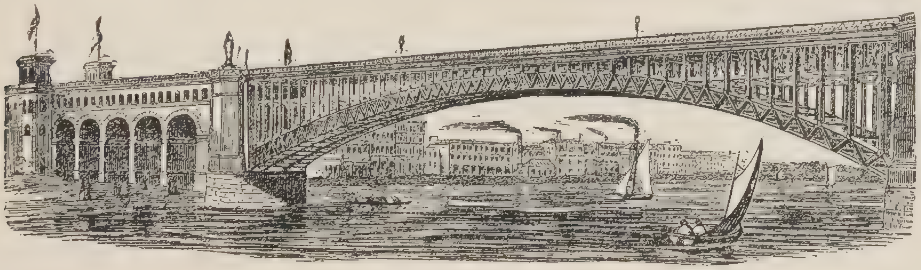
In recent years many improvements have been made in the manufacture of brick, particularly in 1893, when the dry-press system came into use. By means of this system the clays are subjected to a pressure of about six hundred tons, in the dust form, and molded ready to put into the kiln The number of brick burned in a single kiln varies from a few thousand to a million. The dry-press machine has been brought to a high point of perfection and by it from 7,000 to 20,000 brick may be prepared for the kiln in a single day. The pressed brick are the most expensive and are used mostly in the construction of the medium-sized business buildings and in residences. Those used in sidewalks, chimneys, and outside walls are burned harder than those that enter into the inside walls, because of the greater wear when exposed to the weather. Machine-made brick are more durable and heavier than those made by hand because of the greater pressure applied in manufacture.

Pavements are constructed to a large extent of *paving* brick, which are made of a clay that contains a considerable amount of lime. The lime fuses in burning and causes the finished product to become very hard. In the market they are frequently called *vitrified* brick. The larger use of steel frames in constructing the tall buildings of modern times has caused brick to be employed extensively for filling the interior walls, though in some instances they have been replaced by cement. In many buildings, especially in the larger fireproof structures, *hollow* tiles are used for the inside walls.

BRICKLAYING, the art of building with brick. The principal implements of a bricklayer are a *trowel*, for spreading mortar; a *hammer*, for dividing and driving brick; a *plumb line*, for carrying the wall up perpendicularly; a *compass*, for maintaining longitudinal levels; a *rod* five or ten feet long, for taking measurements; and a *hod*, for carrying brick or mortar to the workmen. In small buildings brick and mortar are borne on the shoulders of laborers, but in large ones elevators are used. The mortar is made of lime and sand. The foundation of a brick building is an essential part, as buildings crack by settling unequally, if the basis is defective or the foundation is not based on a solid bottom. Bricklaying has been greatly lessened in larger cities by the newer process of constructing large buildings with steel framework and the use of stone.

BRIDEWELL (brīd'wĕl), a well in London, between Fleet and Thames streets, from which the name was given to a palace, parish, reformatory, hospital, and industrial school. It is now quite generally applied to a police station or a house of correction.

BRIDGE, a structure for carrying a highway over a stream, river, valley, or other impediment to its course. Bridges are constructed of stone, brick, wood, and iron, and seem to have existed from a period of considerable antiquity. The Chinese built them for many ages, perhaps the earliest among the ancients. The first bridges or passages made over streams or ravines were no doubt of trees. Bridges for military purposes were devised long before permanent structures for the convenience of the inhabitants were erected. These bridges were often of boats made to float on the water, with connections for the safe passage of armies. Some bridges were constructed by Cyrus about 536 B. C.; Darius, about 490; and Xerxes, about 480. The Romans seem to have been the first to use stone or brick. They carried the art of bridge building to Greece, after their conquest of that country. The first Roman bridge was built across the Tiber under Ancus Martius. Permanent bridges are now constructed in all civilized countries, though in some countries they are few and imperfect. In India few were erected before the British occupancy of the country.



EADS'S BRIDGE, SAINT LOUIS, MO.

Bridge building became very common in Europe with the extension of the military influence of Charlemagne, and he also established ferries for the safe and permanent crossing of streams. Societies were organized in France and Germany in 1720 to promote the construction of bridges in all parts of those countries. It is thought that the first stone bridge in England was built in 1087 near Stratford, and the second in London in 1186, which was not finished until 1209. Many of the early bridges were erected by companies as business investments and tolls were charged for crossing them. Others were erected by the general government and paid for by tolling. The largest bridges of the world were not built until after steam machinery was invented, which caused a demand for immense iron structures for the passage of railroad trains across streams and cañons.

The construction of bridges varies greatly with the time they are to be used and the purpose they are to serve. *Stone* bridges usually consist of an arch or series of arches. The length of the arch is called a *span*, the perpendicular supports are the *piers*, and the portion that receives the thrust or lateral pressure of the arch is called the *abutment*. The height of the pier depends entirely upon the land adjacent to the stream and the depth of the basin, usually from fifty to one hundred feet high, and the length of the span also varies greatly. The *girder and truss* bridges, especially those using the tubular girder, have largely superseded the arch. Other forms are the *steel arch* and the *cantilever* (q. v.) bridges.

The small bridges of one span have no piers and are supported entirely by the abutments. It often adds strength to have the abutments solidified so a single span will answer the purpose, thus avoiding the necessity of a pier in the strong current. In some cases two or more piers may be distributed so as to occupy positions which are not in the main channel. *Arched* bridges proceed from the sides of the space which they span and are keyed by a *keystone,* sometimes a number of arches constituting the groundwork of a single bridge. *Suspension* bridges span the entire stream, the weight resting entirely upon the piers at the two ends. A number of different methods of construction are employed, but usually the roadway is suspended by chains or wire ropes anchored securely to the masonry or iron at the ends of the bridge. *Swinging* bridges are common in large cities where traffic is carried by boats on canals, or across rivers navigable by large vessels. These bridges are so constructed that they may be turned or swung on a center so as to provide an opening for the passage of vessels, and, when closed, furnish safe passage for street cars, railway trains, and pedestrians. Many such bridges cross the Chicago Drainage Canal, some having as high as eight railroad tracks, weighing over 7,000,000 pounds, capable of supporting about 9,000,000 pounds, and costing nearly a million dollars. Bridges that may be opened and closed are collectively termed *drawbridges*. They include a class known as *lift* bridges, the ends of which are anchored to framework towers so the span may be raised by means of winding drums.

Below is given a list of the notable bridges of the world:

The new London Bridge is constructed of

granite, designed by John L. Rennie. It was commenced in 1824 and completed in about seven years, costing $7,290,000.

The Bridge of the Holy Trinity at Florence, Italy, was built in 1569. It is almost entirely of white marble, 322 feet long, and stands unrivaled as a work of art.

The first large suspension bridge in the world was built across the East River in New York, called the Brooklyn Bridge. It was commenced under the direction of J. Roebling, in 1870, and completed in about thirteen years. It is 135 feet high, 5,989 feet long and cost nearly $15,000,000. About two miles north of the Brooklyn Bridge is the East River or Williamsburg Bridge, on which work was commenced in 1898. The Hudson River Bridge, the master structure of its kind, spans the Hudson River at New York. It has 3,500 feet of main span and a total length of 7,800 feet. It will likely be opened for traffic in 1932.

The Cantilever Bridge over the Niagara is built almost entirely of steel. Its total weight is 3,000 tons, length 810 feet, and cost about $900,000. A similar cantilever bridge spans the Saint John River, in New Brunswick, which has a length of 813 feet. The Poughkeepsie Bridge, across the Hudson River, was built in 1889 and has a length of 6,767 feet. It has five spans, but only three are cantilever spans.

The bridge over the Firth of the Forth, near Edinburgh, Scotland, is 7,295 feet long. It has two spans of 1,710 feet each. It is about 370 feet high, contains 51,000 tons of steel, has twenty-five acres of surface to paint, and cost about $15,000,000. It was commenced in 1883 and completed in seven years.

The Victoria Bridge across the Saint Lawrence River at Montreal, Canada, is tubular and nearly two miles long. It was completed in 1860 at a cost of $6,300,000.

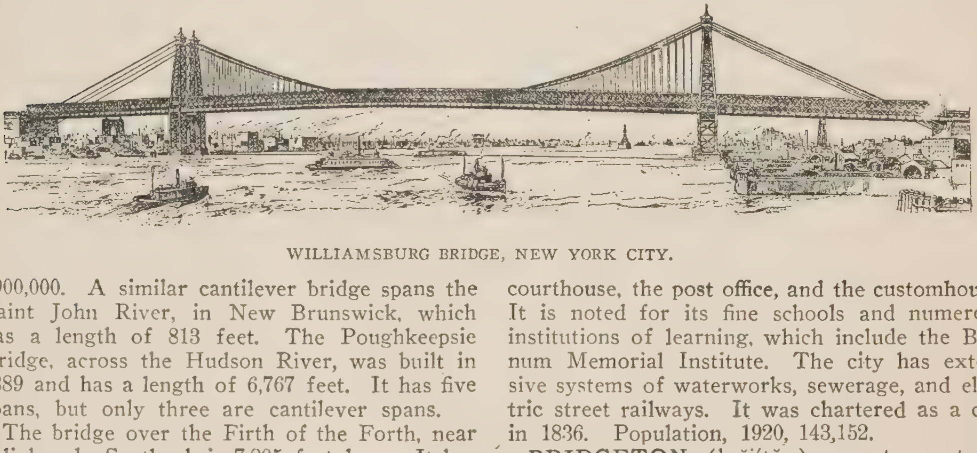
The Eads's Bridge across the Mississippi River from Saint Louis, Mo., to East Saint Louis, Ill., was designed by James Eads, begun in 1869, and completed in five years. It is regarded one of the most wonderful engineering products in America. The Quebec Cantilever Bridge, part of which fell into the river in 1916, has the longest span in the world, 1,800 feet.

The bridge across the Ohio River at Louisville, Ky., is one of the largest iron bridges in America. It has twenty-seven spans, and is 5,310 feet long.

The Omaha Bridge, across the Missouri River, has eleven spans of 250 feet each, and a total length of 2,800 feet. It is the longest swinging bridge ever constructed, having a swinging span of 520 feet.

The largest bridge ever built was the Tay Bridge near Dundee, Scotland. It was completed in 1877, and destroyed by a gale in 1879. This bridge had eighty-five spans, was 10,612 feet long, and cost $10,750,000.

BRIDGEPORT (brĭj'pōrt), a seaport in Connecticut, county seat of Fairfield County, at the mouth of the Pequonnoc River, fifty-eight miles northeast of New York. It is on the New York, New Haven and Hartford Railroad, has a good harbor on Long Island Sound, and carries an extensive navigation and railroad trade. The large sewing machine factories of Wheeler, Wilson & Co. and Elias Howe made the city famous. Besides sewing machines, it manufactures ammunition, tools, castings, piping, corsets, and heavy machinery. Among the chief buildings are the public library, the county courthouse, the post office, and the customhouse. It is noted for its fine schools and numerous institutions of learning, which include the Barnum Memorial Institute. The city has extensive systems of waterworks, sewerage, and electric street railways. It was chartered as a city in 1836. Population, 1920, 143,152.



WILLIAMSBURG BRIDGE, NEW YORK CITY.

BRIDGETON (brĭj'tŭn), county seat of Cumberland County, New Jersey, on Cohansey Creek, thirty-eight miles south of Philadelphia. It is conveniently located on the West Jersey and Seashore and the New Jersey Central railroads, and is a thriving business center. Its manufactories produce clothing, bottles, trucks, machinery, and woolen goods, and include rolling mills and tanneries. There are numerous beautiful churches, and educational institutions, including the West Jersey Academy, South Jersey Institute, and Ivy Hall Seminary. The city has rapid transit, pavements, waterworks, and several libraries. It was settled before the Revolution and was incorporated in 1864. Population, 1905, 13,624; in 1920, 14,323.

BRIDGETOWN, a city of the West Indies, capital of the island of Barbados. It is located on the western coast, along Carlisle Bay, and is the terminus of a railroad. The chief buildings include a hospital, the town hall, and the government building. It has several fine churches, including the Church of Saint Mary and the Church of Saint Michael, and in Trafalgar Square is a statue of Lord Nelson. It is fortified, having a well-equipped garrison. Bridgetown was originally called Indian Bridge. It was partly destroyed by fire in 1845 and has been visited by several hurricanes. Population, 1921, 31,500.

BRIDGEWATER (brĭj'wạ-tẽr), a town of Massachusetts, in Plymouth County, twenty-six miles south of Boston, on the New York, New Haven and Hartford Railroad. It has modern municipal facilities, including waterworks and electric lights. Among the chief industries are brickyards, a shoe factory, and machine shops. It is the seat of a State normal school, a State workhouse, and has several fine school buildings. The first settlement was made on its site in 1645, when it was known as Nuncketest, and in 1656 it was incorporated as Bridgewater. Population, 1905, 6,754; in 1925, 9,468.

BRIDGEWATER, a town of Nova Scotia, in Lunenburg County, twelve miles west of Lunenburg. It is located at the head of the La Have Estuary, and has the main offices of the Nova Scotia Central Railway. Its buildings include several schools and churches, and it has a good trade in merchandise. In 1899 it was partly destroyed by a fire. Population, 1921, 3,147.

BRIDGMAN (brĭj'man), **Laura Dewey,** famous blind deaf-mute, born in Hanover, N. H., Dec. 21, 1829; died in Boston, Mass., May 24, 1889. At the age of two years she became very sick and lost the senses of sight, hearing, and smell, and her sense of taste was impaired to some extent. Her education was intrusted to Dr. Samuel G. Howe, at Perkins Institute for the Blind, in which she afterward became a teacher. She was taught by developing the sense of touch and acquired the use of the alphabet by raised letters, after which she learned to use a lead pencil. She studied arithmetic by handling objects, and geography by using relief maps, and became skillful in doing sewing and housework. After learning of the existence and character of God, she found much delight in reading her Bible. Sound vibrations were not susceptible by her ear, but her sense of touch was so delicate that she could perceive them; a strong beam of light made a slight impression on her right eye. She seemed to enjoy life, was cheerful and of a sociable disposition, and attained some success in teaching others who were blind and deaf.

BRIGANDAGE (brĭg'and-âj), the name applied to the system of robbery organized by gangs of highwaymen, who make their home in secluded places in the forests or among the mountains. Brigandage was at its height in the period of barbarism, when might was recognized as the only right, and those engaged in it practiced robbery upon wayfarers or held them for ransom. It is older than human history, dating back to times before civilization had its rise. The history of Greece accounts that heroes distinguished themselves by suppressing it, and Hercules rid the country of robbers who infested the caverns. In Germany the so-called robber barons practiced brigandage, and we have examples of it in British history in Robin Hood and Dick Turpin. In France the name *brigands* was first applied to the mercenaries who occupied Paris in 1358, when King John was imprisoned.

Brigandage is still practiced in semicivilized countries, or where the government does not exercise a vigorous policy in protecting the life and property of its citizens or those who may sojourn in the country. Regions not densely populated, even in highly civilized countries, are sometimes infested with brigands. We have examples of brigandage as late as 1901, when Ellen Stone was kidnapped in Macedonia and held for a ransom. She and her companion, Madame Tsilka, were detained about five months, until Feb. 6, 1902, when they were released at Strumitza, Turkey, on payment of a ransom of $72,000. Several other noted cases of brigandage took place recently in Morocco and other countries bordering on the Mediterranean. Jesse James (q. v.) and other brigands committed train and bank robberies in the western section of the United States. These crimes were committed usually in small towns or in regions not densely populated, and to escape arrest the robbers destroyed telegraph connection.

BRIGGS (brĭgz), **Charles Augustus,** clergyman, born in New York City, Jan. 15, 1841. He studied in the University of Virginia and in Union Theological Seminary, and took a three years' course at the University of Berlin, Germany. On returning to America, he was called as pastor to the Presbyterian Church at Roselle, N. J., and subsequently was made professor of Hebrew in Union Theological Seminary. He became celebrated partly on account of his teachings regarding scriptural doctrines at variance with his denomination, and was declared guilty of propagating views contrary to the standards of the Presbyterian Church and the Scriptures by a general assembly of the Presbyterian Church of North America, while in session at Washington, D. C., in 1893. He is the author of a number of publications, among them "The Bible, the Church, and the Reason," "The Higher Criticism of the Hexateuch," "American Presbyterianism," "Messianic Prophecies," "The Messiah of the Gospels," and "Ethical Teachings of Jesus." He died June 8, 1913.

BRIGHT (brīt), **John,** English statesman, born at Greenbank, England, Nov. 16, 1811; died March 27, 1889. He was the son of Jacob Bright, a Quaker, and became employed in cotton spinning. In 1835 he made a tour through foreign countries, and on his return to England lectured extensively on commerce and economics. He was an ardent supporter of free trade, and became a member of Parliament for Durham in 1845, for Manchester in 1847, and for Birmingham in 1857. He was a friend of the Union during the Civil War in America. Subsequently he held a number of public positions, but resigned from the ministry in 1882 on account of his opposition to the government in its Home Rule and Egyptian policies. In 1885 he was reëlected to Parliament, though opposed by Lord Randolph Churchill. He ranks in English history as a man of much talent, enlightenment, and skill in public discussion.

BRIGHTON (brī'tŭn), a seaport on the English Channel, in Sussex County, England, fifty miles south of London. It was made the summer residence of George IV., then prince of Wales, in 1782, and has since been popular as a fashionable resort in the summer season, when about 30,000 visitors are here constantly. It is located on elevated cliffs and has many mineral springs. A promenade and drive over three miles long stretches between the city and the coast, one of the finest in Europe. It has beautiful edifices, fine gardens, and several colleges and institutions devoted to learning. The aquarium contains a fine collection of marine life. Although Brighton has some trade and manufactures, it is noted particularly as a center of art and education and as a seaside resort. Population, 1921, 131,250.

BRIGHT'S DISEASE, a granular disease of the kidneys, so named because Robert Bright (1789-1858), an English physician, first made a diagnostic description of it. Its early symptoms consist of the secretion of urine containing a large amount of albumen and less specific gravity than natural, attended by pain in the loins, frequent urination, indigestion, and finally dropsy. It is a fatal disease, remedies having only a palliative effect. It is sometimes induced and always greatly aggravated by the use of alcoholic drinks. The most skillful treatment should be obtained on the appearance of the first symptoms.

BRIMSTONE. See **Sulphur.**

BRINDISI (brēn'dē-zē), a seaport city of Italy, in the province of Lecce, forty-five miles northeast of Taranto. It is situated on a bay of the Adriatic Sea, on a small promontory, and has railroad conveniences and a considerable trade in produce and merchandise. The chief buildings include an ancient castle, a cathedral, and several schools and monasteries. The harbor was dredged by the government in 1860, and it is now entered by the largest sea-going vessels. Anciently it was important as a commercial center, but it declined until the opening of the Suez Canal, when it began to gain in foreign trade. Vergil died at Brindisi in 19 B. C., and at the time of the Crusades it was important as their chief port for embarking to the Holy Land. Population, 1916, 26,347.

BRINTON (brĭn'tŭn), **Daniel Garrison,** ethnologist, born in Thornbury, Pa., May 13, 1837; died July 31, 1899. He studied at Jefferson Medical College and in Heidelberg, Germany, and was a surgeon in the Union army during the Civil War. In 1867 he became editor of the *Medical and Surgical Reporter,* and for some years was professor of ethnology at the Philadelphia Academy of Natural Sciences. In 1886 he was professor of linguistics and archaeology in the University of Pennsylvania. He published "American Hero Myths," "The Myths of the New World," "Religions of Primitive Peoples," and "Library of Aboriginal American Literature."

BRISBANE (brĭz'bān), the capital of Queensland, Australia, on the Brisbane River, about twenty-five miles from its mouth. It occupies a fine site, has an extensive harbor, and is the terminus of several railways and electric railroad lines. The river divides the city into two parts, known as North and South Brisbane, which are connected by the Victoria iron bridge. Among the chief buildings are the post office, two cathedrals, a university, and the State capitol, which was erected at a cost of about one million dollars. Brisbane has four parks and many large stone business buildings. It has waterworks, sewerage, stone and asphalt paving, and gas and electric lighting. The city was founded in 1825 as a penal colony by Sir Thomas Brisbane. When Queensland was set off as a separate colony in 1859, it became the capital, and has since made rapid progress in commerce and wealth. Population, 1921, 179,480.

BRISTLES (brĭs's'ls), the coarse hairs of the hog and some other animals. They are glossy and stiff, and are largest on the back, especially in the wild boar. Bristles are used for various purposes in manufacturing, in making brushes and saddlery, and to some extent by shoemakers. The best grade is obtained from swine grown in cold countries, where the bristles are longer and stiffer. Large quantities are secured from slaughterhouses in the United States and Canada, where they are a by-product. The best grades are imported from Russia and Germany.

BRISTOL (brĭs'tŭl), a borough of Connecticut, in Hartford County, twenty miles southwest of Hartford, on the New York, New Haven and Hartford Railroad. It has a public library, a fine high school, and well-paved streets. The manufactures consist largely of machinery, clocks, ironware, and woolen and cotton goods. Among the municipal facilities are electric street railways, waterworks, and a system of sewerage. It was incorporated as a borough in 1893. Population, 1920, 20,620.

BRISTOL, a borough of Pennsylvania, in Bucks County, twenty-two miles northeast of Philadelphia, opposite Burlington, N. J. It is on the Delaware River and on the Pennsylvania Railroad. Fine mineral springs abound in the vicinity. The manufactures include leather, yarn, woolen and cotton goods, machinery, iron tools, and farm implements. It was settled as early as 1681, when it was called Buckingham, but was incorporated as Bristol in 1720. Population, 1900, 7,104; in 1920, 10,273.

BRISTOL, a port city of Rhode Island, county seat of Bristol County, fifteen miles southeast of Providence, on the New York, New Haven and Hartford Railroad. It is situated on Narragansett Bay, which affords anchorage for large vessels, and has a lively trade in merchandise and manufactures. The harbor is safe and commodious, and it is the seat of shipbuilding yards. The manufactures include cotton, rubber, and woolen goods. A library and several schools and churches are among the public buildings. It is supposed that the Northmen built dwellings in the vicinity in 1000. The first settlement was made on its site in 1675, and it was incorporated in 1746. Population, 1905, 7,512; in 1920, 11,375; in 1925, 12,707.

BRISTOL, a city of Tennessee, in Sullivan County, 128 miles northeast of Knoxville, on the Norfolk and Western and the Southern railroads. It has a growing trade in merchandise and farm produce. Among the manufactures are flour, hosiery, cotton goods, ironware, and machinery. Besides having several fine public schools, it contains Kings College, Southwest Virginia Institute, and Sullins College. It has a public library, waterworks, and electric street railways. Opposite the State line, in Virginia, is the town of Bristol, with a population of 4,579. Bristol, in Tennessee, in 1900, had a population of 5,271; in 1920, 14,776.

BRISTOL, an important city between Gloucestershire and Somersetshire, England, but forming a county in itself. The city is prominent partly because of its mercantile business and partly on account of its early history. It was made a county by itself in 1373 by Edward III. Henry VIII. made it the seat of a bishopric in 1542. It is the seat of many notable buildings, among them a cathedral founded in 1142 and Saint Mary Redcliff Church, founded in 1293. The newer buildings include the public library, the University College, the Queen Elizabeth Hospital, an observatory, and the Clifton College. Large coal mines are operated in the vicinity. The city has chemical works, sugar refineries, soap works, glass works, potteries, tanneries, ship yards, and machine factories. It carries an important jobbing business and a large export and import trade. It is built on both sides of the Avon River, which is crossed by the famous Bristol suspension bridge, 705 feet long and 245 feet above high-water mark. Extensive docks are maintained on the Avon and at Avonmouth and Portishead. The Great Western, one of the first steamers to cross the Atlantic, was built in Bristol in 1838. The noted philanthropist Colston founded a number of charities in the city, and a holiday is set apart to his honor. It has gas and electric lighting, stone and asphalt pavements, waterworks, a system of sewerage, and many hospitals and charitable institutions. Bristol was known as Bricgstow to the Saxons. Population, 1921, 357,059.

BRISTOL CHANNEL, the largest inlet of Great Britain, extending from the Atlantic Ocean, between the southern peninsula of England and the southern shores of Wales, and forming the estuary of the Severn. It is about eighty-five miles long, from five to forty-five miles wide, and has a coast of about 225 miles. It is remarkable for its high tides, or bores, which roll up the channel at a height of from six to forty feet. Among the rivers that flow into it are the Severn, Avon, Wye, Axe, and Torridge. Lundy Island is near the entrance.

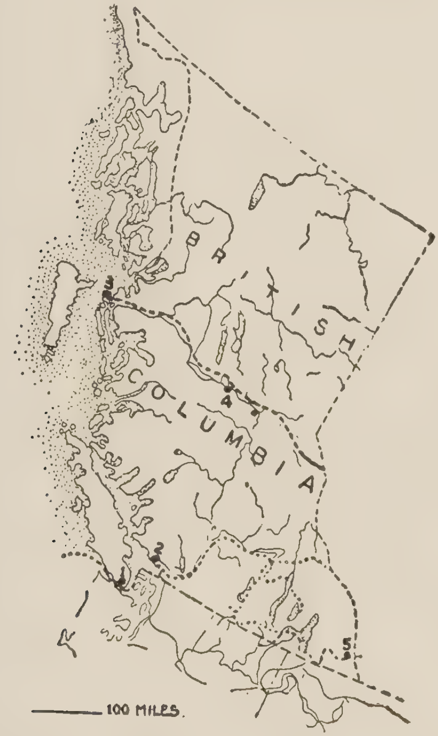
BRITISH AMERICA, the possessions of Great Britain in North America, located north of the United States, and including the Dominion of Canada and Newfoundland. Its area is 3,677,500 square miles and population 5,987,698. See **Canada** and **Newfoundland.**

BRISTOW (brĭs'tō), **Benjamin Helm,** statesman, born in Elkton, Ky., June 20, 1832; died June 22, 1896. He attended Jefferson College, Pennsylvania, and practiced law in Kentucky. He served throughout the Civil War in the Union army and was mustered out as colonel. Later he was a member of the Kentucky State Legislature, and in 1872 became solicitor general for the United States. In 1874 he was made Secretary of the Treasury, in the administration of President Grant, and while in this office prosecuted the Whisky Ring. He was a candidate for the nomination for President in 1876, but was defeated by Hayes, and subsequently practiced law in New York City.

BRITISH ASSOCIATION for the Advancement of Science, an important society of Great Britain, whose object is to bring together eminent men to promote discovery and to diffuse the results of scientific research. This association was organized in 1831 under the leadership of David Brewster, and its first meeting was held on Sept. 26 of that year at York. The second meeting was held at Oxford in 1832, and since then the meetings have been regular each year, usually the latter part of August. Two meetings were held in Canada, one at Montreal in 1884 and the other at Toronto in 1897. The membership of the society is about 5,500. It is supported by fees and annual dues. The income is larger than needed for actual support, and the surplus is used to promote investigations and scientific researches. The general meeting is presided over by the president, who delivers an annual address, after which meetings are held by the ten sections, each having its own committee and presiding officer.

BRITISH CENTRAL AFRICA, or **Nyas-**

saland, a colonial possession of Great Britain in the east central part of Africa. It is bounded by Lake Nyassa, Portuguese East Africa, German East Africa, and the Congo Free State. Southeast of it is Rhodesia, of which it is an extension. The area is 41,800 square miles. The surface is an elevated plateau, and the drainage is chiefly by the Shire River. It has an abundant rainfall, but the climate is not as healthful as that of the country lying toward the south. Coffee, ivory, tobacco, and rubber are exported, and the chief imports are machinery and clothing. Blantyre, the largest town, has a population of 7,500, including about one hundred Europeans. The protectorate was organized in 1891, and since then mining and farming have been introduced. Zomba, in the Shire region, is the seat of government. Population, 1922, 928,451.



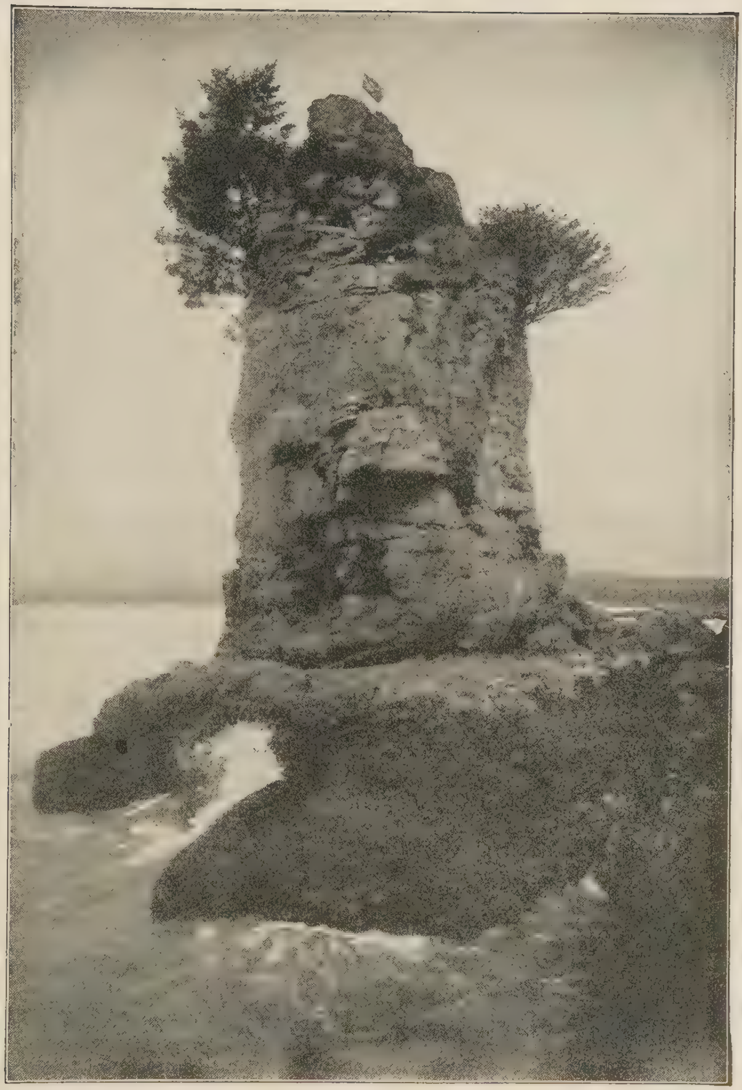
1, Victoria; 2, Vancouver; 3, Prince Rupert; 4, Fort Fraser; 5, Kootenay Lake. Dotted lines show chief railroads.

BRITISH COLUMBIA, the most westerly Province of the Dominion of Canada, located between north latitudes 49° and 60°. It is bounded on the north by Yukon and Mackenzie, east by Alberta, south by the United States, and west by Alaska and the Pacific Ocean. From north to south it has a length of 790 miles; breadth from east to west, 620 miles; and area, 312,630 square miles. The coast line, including indentations, is about 12,000 miles.

Description. The surface is mountainous, except in the northeastern part, which lies in the basin of the Mackenzie River. The mountains are outer fringes of the Cordilleras of North America, and the chains extend from southeast toward the northwest. Ranges of the Rocky Mountains, which attain elevations ranging between 7,000 and 8,000 feet, trend through the western part, and between them and the coast is the comparatively low Coast Range. In the southeastern part, extending almost parallel to the principal chain of the Rocky Mountains on the line of Alberta, are the Gold Range and Selkirk Range. These mountains are the highest of those in the southern part, and their loftiest peaks, including Victoria, Leroy, and Dawson, have a height of from 9,000 to 11,600 feet. However, the highest summits are near the boundary of Alaska, where peaks of the Rocky Mountains rise to elevations which approximate 16,000 feet. These include Mount Columbia, 14,000 feet; Robson Peak, 13,700 feet; and Mount Fairweather, 15,340 feet. Kicking Horse Pass, where the Canadian Pacific Railroad crosses the continental watershed, is 5,300 feet, and north Kootenay Pass is 6,550 feet above the sea, while the mountains in the vicinity rise about 10,000 feet and are covered with snow the entire year.

The Columbia drains the southeastern portion and crosses into the United States, discharging into the Pacific. Through the south central part flows the Fraser, which rises near the line of Alberta, has a course toward the northwest, and then turns and flows almost due south to a point near the southern boundary, when it turns toward the west and discharges into the Strait of Georgia. In the northern part are the Taku, Stikine, Nass, and Skeena, which flow into the Pacific, the Liard, a tributary of the Mackenzie, and the Peace, which joins the Athabasca in Alberta. A number of lakes are distributed through the central part, all of them quite long and narrow. They include lakes Kootenay, Okanagan, Upper and Lower Arrow, Tacla, Babine, and Stuart. The sea coast is serrated and characterized by rugged cliffs and fiordlike estuaries. Near the mainland are a large number of islands, but all are small, except Vancouver and the Queen Charlotte Islands.

Climate and Soil. The climate is warmer than that of any other province in Canada, on account of the warm winds from the Pacific, and differs greatly from that of the cold region of the Atlantic coast. These winds modify the temperature noticeably in most of the province, but much of their moisture is given up when they come in contact with the higher altitudes of the Coast Range; hence the climate is less uniform in the eastern part and the rainfall is less copious. At Victoria, on Vancouver Island, the average temperature for January is 37° and for July 60°, and flowers bloom in the garden the entire year. The climate at Vancouver is practically the same, but in the interior the temperature varies from 40° below zero in win-



SIWASH ROCK, NEAR THE ENTRANCE TO VANCOUVER HARBOR
Travelers arriving by vessel at Vancouver observe, on entering the harbor, Siwash Rock rising from the water like a massive tower. This great rock is one of the most picturesque features in the rugged scenery that characterizes much of the channel that forms the pathway between the city and the open sea.

(Opp. 376)

ter to 100° above in midsummer. Rainfall is most abundant along the coast, ranging from 40 inches at Victoria to about 100 inches in the northern part, and diminishing toward the eastern part, where some localities do not have sufficient to farm without irrigation. The rains and snows are heaviest on the western slopes, and the passes of the Gold Range and Selkirks have glaciers and snowfall to the depth of thirty feet. The Chinook winds make the Peace River valley pleasant and agriculture profitable in that section.

FLORA AND FAUNA. The forest resources possess much value, and the trees are of a northern type. Dense forests are particularly abundant on the western slopes of the coast ranges, and a heavy growth of timber covers the eastern slopes, but the high plateau of the interior is almost treeless. The red cedar is found in large quantities widely distributed, but the yellow cedar is confined to the northern region. Forests of spruce and hemlock abound. Other trees of commercial value are the oak, cherry, fir, yellow pine, yew, white maple, cottonwood, and arbor vitae. Fish are abundant in all the streams and off the coast, particularly the salmon, which is caught in large quantities at the mouth of the Fraser and other rivers. The wild animals include the moose, caribou, deer, bighorn, bear, puma, and wild cat.

MINERALS. Many valuable minerals are found in British Columbia. Gold was discovered in 1851 in the gravel along the rivers, from which it was obtained in paying quantities, but placer mining is not carried on to a great extent at present. The Kootenay district has been the chief source of gold, but mining has been developed in the mountains farther north. A fine grade of bituminous coal is obtained on Vancouver Island and in the Rocky Mountains. Copper is mined in the southeastern portion. Other minerals include silver, lead, and platinum.

INDUSTRIES. Agriculture is growing steadily, both in the production of cereals and in rearing live stock. Many of the valleys are remarkable for their fertility, such as that of the lower Fraser, where farming has reached a high degree of development. The cereals grown include wheat, oats, barley, rye, and millet. Fruit is cultivated successfully, including interests in most of the varieties common to the temperate latitudes. Irrigation has been introduced in the arid regions of the interior, but most of the farming is done where the rainfall is abundant, including some sections of the Peace River valley.

The salmon fishing and canning industry is an important enterprise. Many canneries are located on the coast and along the rivers, especially on the Nass, Skeena, and Fraser. The canneries of the Fraser River produce about one-half of the salmon packed in British Columbia, and those of the Skeena are second in importance. Fur sealing is an important enterprise. Other fisheries which are prolific as a source of wealth include those of the cod, herring, halibut, and sturgeon.

While mining and the fisheries have ranked as the two leading industries, there has been much development in lumbering. The Douglas fir, or Oregon pine, yields vast quantities of choice building material. Many specimens of this tree have a diameter ranging from ten to eighteen feet and a height of three hundred feet. It is exceeded in size by the cedars, whose diameters reach twenty feet in some individual specimens. However, both furnish a valuable grade of lumber. Other varieties used in lumbering include the cypress, hemlock, yew, and yellow pine. Vast quantities of timber are exported to Europe, Africa, and South America.

Many of the rivers are navigable and furnish important transportation facilities to carry trade with interior points. Some of the lakes, though not connected with the ocean by navigable streams, are used in transporting locally by steamboat. The Canadian Pacific Railway has a transcontinental line through the southern portion with the terminus at Vancouver, whence traffic is carried by steamer to Victoria, which has railroad facilities by lines on Vancouver Island. The line of the Canadian National Railway passes through the central part, with the terminus at Prince Rupert, near the mouth of the Skeena River. Vancouver, Victoria, New Westminster, Prince Rupert, and Ladysmith are among the ports.

GOVERNMENT. The executive branch of government is vested in a lieutenant governor, appointed by the Governor General of the Dominion, and he is assisted by an executive council of eight members. The legislative authority is vested in a single chamber of forty-eight members elected by the people. A system of public schools is supported by taxation, and includes common, graded, and high schools, all of which are free and undenominational. Many private schools and colleges are maintained, including denominational colleges at New Westminster and Vancouver. Public normal schools for the training of teachers are located at Victoria and Vancouver, and the University of British Columbia is situated at Point Grey, near Vancouver.

INHABITANTS. The population is made up largely of Canadians and Europeans, including English, Irish, and German. The Indian population is about 25,000, and the Chinese and Japanese together number 20,000. Victoria, the capital, is located on Vancouver Island. Other important cities include Vancouver, Nanaimo, Nelson, Rossland, Ladysmith, and New Westminster. The population of the province, in 1921, 524,582.

HISTORY. Captain Cook explored a part of the coast of British Columbia in 1787, and a settlement was made by the English ten years later at Nootka. However, the settlement was broken up by the Spanish, who claimed the coast as far north as latitude 61°, where the territory of Russia was supposed to end. In 1846 the question of possession was settled by diplomacy, when the United States relinquished its claim and the territory now in British Columbia became a possession of the British crown. The claims of the United States were based on the Louisiana Purchase and explorations made by Lewis and Clarke, out of which grew the campaign cry of "54-40 or fight," at the time Polk was elected President of the United States. Vancouver Island was organized as a crown colony as early as 1849, but little progress was made in developing the country until the discovery of gold in 1858, when settlers began to pour into British Columbia, and it was made a crown colony the same year. The two colonies were united in 1866 as a political entity under the name of British Columbia. In 1873 a dispute in regard to the boundary was submitted to the Emperor of Germany, who awarded the San Juan Islands to the United States. The colony entered the Dominion in 1871, under an agreement that the federal government should provide railway connection with the Atlantic coast, and this was accomplished in 1887, when the Canadian Pacific Railway was opened for traffic.

BRITISH EAST AFRICA, a large territory within the British sphere of influence, located between Abyssinia and German East Africa, and extending from the Indian Ocean to the Congo Free State. The boundaries are not well defined, since there has been no definite agreement in regard to the boundary between it and Abyssinia. It includes the islands of Pemba and Zanzibar, and has an area of about 1,000,000 square miles. For the purpose of government, it is divided into the three protectorates known as Uganda, British East Africa, and Zanzibar. The former two are administered by British commissioners located at Entebbe and Mombasa, and the last mentioned is under a native sultan, who is advised by a British agent.

The region is rich in minerals, especially iron and copper Fruit, palms, and spices are abundant on the coastal plain. The interior is not rich in vegetation, especially in the arid highlands, where large tracts have a scanty growth of small grasses. Forests of evergreen trees abound in many parts, and in the jungles are vast growths of bamboo. The large mammals of Africa are numerous, including the hippopotamus, elephant, rhinoceros, giraffe, and antelope; the reptiles include the python, cobra, and crocodile; and the birds are especially numerous, among them being the pelican, flamingo, weaver bird, and sunbird.

A railroad extends from Mombasa, on the Atlantic, to Lake Victoria Nyanza, a distance of 584 miles, and will be connected with the Cape-to-Cairo line. Rubber, ivory, hide, grain, copra, and live stock are exported. The inhabitants are chiefly Arabs and Negroes. Most of the trade is in the hands of the Arabs at Zanzibar and near the coast, and the farming and pastoral regions of the interior are occupied by the Bantu and Nilotic Negro races. Population, 5,150,000.

BRITISH GUIANA. See **Guiana.**

BRITISH HONDURAS (hŏn-dōō'räs), or **Belize,** a colony in Central America, belonging to the crown of Great Britain. It is situated east of Guatemala and southeast of Mexico, and has an extensive coast line on the Caribbean Sea. Its area is 7,562 square miles. The coast is quite low and swampy and the western part is diversified by hills and valleys. Among the chief products are fruit, mahogany, logwood, coffee, sugar, rubber, and live stock. This colony is still unprofitable, since the revenues seldom equal the expenditures, and it is necessary for the home government to grant aid. At present the indebtedness is placed at 170,000. Belize, population 9,113, is the capital and chief commercial city.

The inhabitants consist principally of Negroes and Indians, including only about 400 whites. A large number of elementary and three secondary schools are maintained. The language is a mixture of native tongues with English and Spanish. Numerous attempts have been made to throw off British rule, but English sovereignty has been recognized since 1783. Since 1884 it has been a separate colony. Population, 1921, 41,007.

BRITISH ISLES, an archipelago of Europe, located off the western coast of that continent. It is bounded on the north and west by the Atlantic Ocean, east by the North Sea, and south by the English Channel and the Strait of Dover. Great Britain and Ireland are the chief islands, besides which are included the Shetland Islands, the Hebrides, the Orkneys, and the Channel Islands.

BRITISH MUSEUM (mū-zē'um), the largest national institution of Great Britain, located on Great Russel Street, London. It was founded in 1753, when Sir Hans Sloane donated his library collection of about 50,000 books and manuscripts on condition that $100,000 be paid to his heirs, which was much less than half the cost. The Montague House was purchased and opened as a seat for the library in 1759. A new building was erected in 1823, and the present large structure was completed in 1857, but extensive additions were made in 1882 and since. The main structure is 375 feet long. About 200,000 persons use the reading rooms each year, and it is visited by about 700,000 persons annually. The printed books include a total of about 2,000,000 volumes, being exceeded in number only by the Bibliothèque Nationale of France. In addition to this collection of books, it contains many pamphlets and manuscripts.

The museum is open and free to the public. It is lighted with electric lights and has every convenience of modern invention. Priceless rarities of every age and every country are on the shelves, constituting one of the most valuable collections in the world. There are a number of departments, each of which is located in a suitable part of the buildings, and the whole is under the direction of forty-eight trustees, of whom the chief officers are the Archbishop of Canterbury, the Lord Chancellor, and the Speaker of the House of Commons. The most important departments include those of Printed Books, Maps, Manuscripts, British and Mediaeval Antiquities, Egyptian and Assyrian Antiquities, Greek and Roman Antiquities, Coins and Medals, and Prints and Drawings. The collections represent every noted personage and all industries, sciences, arts, and discoveries of ancient and modern research. It has been fittingly said that the museum is a "perpetual monument of the munificence, judgment, and liberal taste of its royal founder, a splendid ornament to the throne and a perpetual benefit to learning."

BRITISH NEW GUINEA. See **New Guinea.**

BRITTANY (brĭt'ta-nȳ), or **Bretagne,** an ancient province in western France, consisting of a large triangular peninsula that projects into the Atlantic. The region now includes the five departments of Morbihan, Finistère, Ille-et-Vilaine, Côtes-du-Nord, and Loire-Inférieure. It has an area of 13,644 square miles. The people, called Bretons, are descendants of the Bretons who were expelled from England in the 5th century. They retained their ancient language, known as the Armorigion, which is similar to the Welsh, and is still used in the rural districts. The people engage largely in fishing and agriculture, and are noted as brave seamen. This region of France has not been interested extensively in manufacturing and commerce, but these industries are beginning to assume considerable importance. Many remains of the ancient Druids have been preserved in Brittany. The folklore and songs of the Bretons are among the richest, many entering as modifying factors into the writings in other languages. The district has been subject to many military contentions, but the people have shown marked loyalty to the French government, especially to the house of Bourbon. A majority of the people speak French and belong to the Roman Catholic Church. Population, 1922, 3,258,314.

BROCADE (brô-kād'), a silk fabric, woven so the raised threads of the warp or woof produces figures of flowers, foliage, or other objects. The term is not applied to figures embroidered on silk textiles, but is restricted to those made in the loom. Originally the threads were made entirely of gold or silver, or of the two mixed, and cloth of this kind was used in making the most costly dresses.

BROCK (brŏk), **Sir Isaac,** soldier, born on the island of Guernsey, Oct. 6, 1769; died Oct. 13, 1812. He entered the British army at the age of fifteen, and by successive promotions soon reached the rank of lieutenant colonel. In 1799 he commanded a regiment in North Holland, where he took part in the Battle of Egmont-op-Zee, and subsequently fought with Nelson at Copenhagen. He was sent to Canada in 1802, but returned to England in 1805, and again came to America soon after on account of the threatened hostilities with the United States. In 1810 he received command of all the troops in Upper Canada, and the following year was raised to the rank of major general. He captured Detroit in 1812, for which he was made a Knight of the Bath. He commanded at Queenstown Heights, on the Niagara, where he fell mortally wounded on Oct. 13, while the Americans were making an attack. A monument surmounted by a statue of Brock stands on the place where he fell.

BROCKEN (brŏk'ken), or **Blocksberg,** a mountain of Germany, in the province of Saxony, 20 miles southwest of Halberstadt. It has an elevation of 3,745 feet above the sea and is the highest summit of the Hartz Mountains. From its top the observer has a fine view of the surrounding country. It is famous in folklore, owing to the fact that the atmospheric conditions cause shadows of the spectators to be projected on the fog, which are best seen at sunrise. See **Walpurgis Night.**

BROCKTON (brŏk'tŭn), a city of Plymouth County, Massachusetts, about twenty miles south of Boston, called Bridgewater prior to 1874. It is noted for its great wealth and the manufacture of boots and shoes, in which it takes very high rank. The general manufactures include shoe tools, machinery, paper, and wooden boxes. It carries a large jobbing trade in merchandise. Gas and electric lights, waterworks, stone and asphalt pavements, and electric street railways are among the improvements. The city library has 45,500 volumes. It was first settled in 1700 and received its charter as a city in 1881. Population, 1905, 47,782; in 1920, 66,254; in 1925, 65,343.

BROCKVILLE (brŏk'vĭl), a city in Ontario, county seat of Leeds County, on the Saint Lawrence River, about forty miles from Kingston. It is on the Canadian Pacific and the Canadian National railways, in a rich agricultural country, and engages extensively in the manufacture of flour, hardware, farming implements, engines, and large machinery. The chief buildings include the courthouse, the public library, the high school, and the town hall. It has a system of sewerage, waterworks, and electric railways. Brockville was named from Sir Isaac Brock. Population, 1901, 8,940; in 1921, 10,003.

BROGLIE (brô'y'), **Jacques Victor Albert, Duc de,** historian and statesman, born in Paris, France, June 13, 1821; died Jan. 19, 1901. After attending public and private schools, he took extensive courses in the University of Paris, and at an early age turned his attention to literary work. He sided with the party that favored the temporal power of the Pope, being a leader in that movement after the Revolution of 1848, and was made a member of the French Academy in 1862. In 1873 he became premier in the cabinet of President McMahon, and served in that position until the following year. He was chosen a senator in 1876 and was leader of the reactionary party, and was again premier and minister of justice in 1877. Though eminent as a statesman and political leader, he is better known as a historical writer, his works being related chiefly to the period of Louis XV. and Talleyrand and the times of Marie Theresa. His "Church and the Roman Empire in the Fourth Century" is a history of the reign of Constantine written from a Catholic standpoint.

BROKEN WIND, or **Heaves,** an incurable disease in horses, due to a rupture of the air cells in the lungs. It is accompanied by an enlargement of the lungs and heart. The symptoms are most noticeable when the horse is exercised, which causes the blood to be imperfectly purified, causing the nostrils to dilate and the breathing to become labored. The inspiration in breathing is rapid, but expiration is difficult and requires about double the usual time. In advanced stages of the disease two efforts are necessary in exhaling, one rapidly succeeding the other.

BROKER (brō'kẽr), an agent who engages in the business of negotiating contracts relative to trade or commerce in consideration of a definite per cent. of the profits, or of a fixed salary. Brokers differ from other classes of agents in that they do not have the custody of the property they offer for sale. The compensation they receive is called *brokerage,* or *commission. Insurance brokers* are agents for underwriters, who insure owners of vessels and transporters of commodities against losses. *Stock brokers* deal in shares of stock companies and monetary investments, *ship brokers* transact business for owners of vessels, and *bill brokers* buy and sell bills of exchange for others.

BROMINE (brō'mĭn), one of the nonmetallic chemical elements. It was discovered by Antoine Jerome Balard (1802-76), a French chemist, while he was extracting common salt from sea water. This element is not found in the isolated state, but occurs in minute quantities in sea water, in the ashes of marine plants, in combination with alkalis, and in the water of some mineral springs. It has a dark reddish color when in the liquid form, freezes at 19.4°, and boils at 145.4°. It is poisonous, has a suffocating odor, and combines readily with metals. The most important use of bromine is for the manufacture of bromide of potassium, which is used in photography and medicine, and it has value as a disinfectant and for bleaching. It is made extensively from the salt water of mineral springs at Stassfurt, Germany, Syracuse, N. Y., the Kanawha region in West Virginia, and other sections of the United States.

BRONCHI (brŏn̲'kī), the divisions of the trachea or windpipe, which conveys the air into the lungs. The trachea divides in the chest, forming two bronchi, one of which enters the right and the other the left lung, where they divide and subdivide to form minute tubes. The walls of these tubes are composed of fibro-muscular tissue strengthened by plates of cartilege, and at the extremity is a cluster of air cells.

BRONCHITIS (brŏn-kī'tĭs), an inflammation of the bronchial tubes leading from the trachea to the lungs, and affecting the mucous membrane. There are several forms of the disease, designated as *acute, chronic, plastic, mechanical,* and *syphilitic.* All varieties are preceded by a cold in the chest, but later complications may set in and render the disease dangerous. The early symptoms include pain in the chest, shortness of breath, and the expectoration of mucus. Sometimes the disease takes on an acute form or merges into pneumonia.

BRONCHO (brŏn̲'kô), a nearly unbroken native horse, usually an Indian pony or one bred from Indian stock, also called *mustang.* The term is used commonly in the western part of the United States, where it is applied to small, active horses. It is said to be from a Spanish word which signifies that they can never be broken.

BRONTË (brŏn'tĕ), **Charlotte,** afterward Mrs. Nicholls, talented novelist, born at Thornton, England, April 21, 1816; died March 31, 1855. She was a daughter of Patrick Brontë, a clergyman of Irish descent, and her mother died when Charlotte was still a child. After receiving an education, she became a teacher and then a governess in a small family. She studied French and German at Brussels in 1842, and in 1846 published a volume of poems, which was from the pen of the three Brontë sisters, under the names of Currer, Ellis, and Acton Bell. It did not attract much public interest, a circumstance which caused her to devote her efforts to prose writing. Her books include "Agnes Grey," "Jane Eyre," "Shirley," "Villette," and "The Professor." The last named was not published until after her death. In most of her writings she was assisted by the two sisters, Emily (Ellis Bell) and Anna (Acton Bell). "Jane Eyre" was translated into a number of European languages and was dramatized. In 1854 she married Rev. Arthur

Nicholls, her father's curate. Her biography was published in 1857 by Mrs. Elizabeth Gaskell (1810-65) under the title "Life of Charlotte Brontë."

BRONZE (brŏnz), a fine-grained alloy of copper and tin, in variable proportions. It is harder and more fusible than copper, and is used chiefly in making church bells, cannon, statues, utensils, and various useful appliances. The ancients used it largely for weapons and utensils, and it has been found among the antiquities of China, Egypt, Assyria, Europe, and Mexico. In making the common bronze the proportions are about nine parts copper to one of tin; in instruments, twelve to one; in machinery, eight to one; in musical bells, six to one, and in large bells, three to one. The metals are melted separately, and they are afterward united in a molten state and cast in molds. In some kinds of bronze, zinc, silver, and lead are added, while aluminum and copper also make a bronze alloy. The bronze formed of aluminum and copper is strong, ductile, and malleable. The proportion is one of the former to nine of the latter.

BRONZE AGE, the term used to denote the stage of culture of a people at the time of using bronze for implements and weapons. The classification includes the three ages in this order: the *stone age,* the *bronze age,* and the *iron age.* It was adopted and developed by Danish scholars, including Nilsson, Thompsen, and Forchhammer. The classification does not apply equally to all nations, nor to different nations in the same period. The stone age existed in some countries while others were passing through the bronze and iron ages. In the stone age the weapons or implements consisted of stone and bone, metal being yet unknown. In the bronze age the method of alloying copper and tin had been discovered, but iron was yet undiscovered. Later iron took the place of bronze. These views have been adopted by geologists, though some think the age of copper intervened between that of stone and bronze. In Denmark, during the age of bronze, the oak was the dominant tree; the Scotch fir having flourished in the stone age, but became extinct in the bronze age, while the beech was and remains the prevailing tree of the iron age. Among the tools of the bronze age of different countries are found saws, hammers, awls, sickles, knives, daggers, swords, axes, spears, arrows, anvils, gouges, and shields. The composition of bronze varies with different periods and the size and form of the implements were changed frequently. The composition of bronze consisted mostly of ten parts of tin to ninety of copper. In some cases other metals were added.

BROOK FARM, a community established at West Roxbury, Mass., by George Ripley (q. v.) in 1841. The organizer associated with himself a number of men and women prominent in American History, and announced that the object was to substitute a system of brotherly coöperation for one of selfish competition. Among the members of this socialistic venture were Charles A. Dana, George W. Curtis, W. B. Channing, Nathaniel Hawthorne, Bronson Alcott, Margaret Fuller, and Theodore Parker. Hawthorne made use of many of his experiences at Brook Farm in writing his work of fiction entitled "Blithedale Romance."

BROOKFIELD, a city in Linn county, Missouri, on Yellow Creek, twenty-four miles east of Chillicothe. It is on the Chicago, Burlington and Quincy Railroad, and is surrounded by a region rich in coal deposits. It was incorporated in 1865. Population, 1920, 6,304.

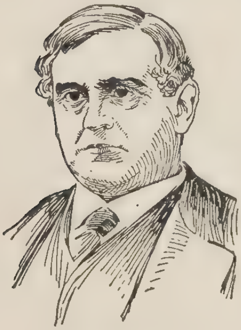
BROOKHART, Smith Wildman, public man, born in Scotland County, Mo., Feb. 2, 1869. He studied in the public schools and at the State Normal School of Iowa, after which he engaged in public school teaching for five years. Later he was admitted to the bar and practiced law. He saw active service in the Spanish-American War as well as on the Mexican border and in the World War. In 1922 he was elected to the United States Senate, but was defeated by Daniel F. Steck in the next election, and was again elected in 1926. He is classed as a prominent Progressive-Republican.

BROOKHAVEN, county seat of Lincoln County, Mississippi, 55 miles southwest of Jackson, on the Illinois Central Railroad. It is surrounded by a farming and lumbering region and has an extensive trade in merchandise. The buildings include the court house, high school, city hall, and federal building. It has the Whitmore Female College. Population, 1920, 4,706.

BROOKLINE (brŏŏk'lĭn), a town in Norfolk County, Massachusetts, four miles west of Boston, on the Charles River. It is on the Boston and Albany and other railroads, and is connected with Boston by a system of electric railways. Brookline is a suburban residence portion of Boston, and was originally a part of that city, but was incorporated separately in 1705. It has manufactories of clothing, machinery, and electrical supplies. With it are included the villages of Longwood, Reservoir Station, and Cottage Farm. Population, 1925, 42,681.

BROOKLYN (brŏŏk'lĭn), the "City of Churches," formerly one of the largest and most important cities in the United States, but united with the city of Greater New York in 1898 by a legislative bill passed May 11, 1896. This portion of New York City is located on the west end of Long Island, and is connected with the other portion of the great city over the East River by the Brooklyn Suspension Bridge, the Williamsburg Bridge, and the new East River Bridge. Intercommunication is further facilitated by the extension of the Subway under the East River and by many lines of ferries. It is noted as a financial center, has many valuable structures, is improved by all modern conveniences, and is beautified by parks and other public improvements. The first settlement on its site was made by the Dutch in 1636, and it was incorporated as a city in 1834. At the time of its union with New York the city contained a population of 995,276. It is now divided into twenty-one aldermanic districts and represented by that number of aldermen in the common council. Population, 1905, 1,358,891; in 1920, 2,018,358. See **New York.**

BROOKS, Phillips, clergyman, born in Boston, Mass., Dec. 13, 1835; died Jan. 23, 1893. He graduated at Harvard College, and received training in theology at Alexandria Seminary. He was ordained as an Episcopal minister in 1859, became rector of the Church of the Advent at Philadelphia, and ten years later was made rector of the Trinity Church in Boston. He preached on numerous occasions at Harvard College, where he made many friends, and in 1891 became bishop of Massachusetts. His lectures were thoughtful and popular, and he was one of the most powerful sermonizers of his church in America, being rapid in utterance and spiritual in thought. He published five volumes of his sermons which are still widely consulted. Many institutions of America and Europe conferred distinguished honors upon him. His works include the hymn "Oh, Little Town of Bethlehem," "The Influence of Jesus," and "Lectures on Preaching."


PHILLIPS BROOKS.

BROOKS, Preston Smith, statesman, born in Edgefield District, S. C., Aug. 4, 1819; died Jan. 27, 1857. He attended the State University of South Carolina. In 1844 he was elected to the State Legislature and later served through the Mexican War. In 1852 he was elected to Congress as a Democrat and was reëlected in 1854. He became notorious for his assault upon Charles Sumner on May 22, 1856, after the latter delivered a speech in the Senate on "The Crime Against Kansas," in which he had referred to South Carolina with great severity. For this action Brooks was generally condemned in the North, while some of the people in the South passed resolutions in his honor.

BROOM (brōōm), a plant of the bean family, native to many parts of Europe. It has yellow flowers and grows in heaths and sandy soil. Several species have been described, some of which are shrubs. The common broom is planted for its fiber and a yellow dye obtained from its flower. The *white broom* is cultivated in England as an ornamental shrub. It bears white flowers and attains a height of twelve to fifteen feet.

BROOM CORN (kôrn), a name applied to two plants with jointed stems belonging to the order of grasses. The panicles of a species belonging to the *sorghum vulgare* are made into brooms for sweeping and clothes brushes. The seeds are valuable as food for cattle and poultry, It grows to a height of twelve to fifteen feet, and is cultivated very much like corn. There are numerous species, all of which are produced chiefly in America, where the annual production is valued at several million dollars. See **Sorghum.**

BROTHERHOOD OF ANDREW AND PHILIP, a society organized in 1888 by Rufus W. Miller, a pastor of the Reformed Church at Reading, Pa. Its purpose is to foster good will and Christian fellowship and to spread the Christian faith by enjoining its members to bring people within hearing of the gospel. To this organization belong many members of evangelical denominations. In 1908 it had 920 chapters and a membership of 32,000, and was promoted by organizations in the United States, Canada, Australia, and Asia.

BROTHERHOOD OF SAINT ANDREW, an organization of the Protestant Episcopal Church. It was founded in Chicago in 1883, at Saint James Parish. The object is to spread the kingdom of Christ among young men. Two departments are maintained, the *junior* and the *brotherhood,* and the local chapter is the unit of organization. In 1908 the junior department had 8,000 members and the brotherhood proper had 15,000. Pittsburg, Pa., is the headquarters. Organization work is promoted in all the continents.

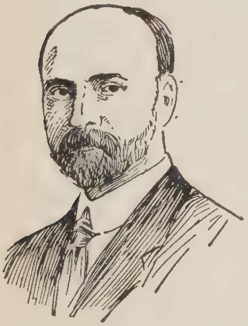
BROUGH (brŭff), **John,** statesman, born at Marietta, Ohio, in 1811; died in Cleveland, Aug. 29, 1865. His education was obtained chiefly in printing offices, and he became publisher of the *Washington County Republican,* and later of the *Lancaster Eagle.* He early became prominent in State politics, acting with the Democrat party. He was elected Governor in 1863, and served the State with much patriotic devotion during the exciting scenes common to Ohio in the Civil War, on account of which he became known as the "War Governor."

BROUGHAM (brōō'am), **Henry, Baron Brougham and Vaux,** born in Edinburgh, Scotland, Sept. 19, 1779; died in Cannes, France, May 9, 1868. He was a man of good education and became an important factor in establishing the *Edinburgh Review* in 1802. About this time he was admitted to the bar and entered Parliament in 1810. He became a fearless and successful defender of Queen Caroline, in 1820, in the contest with George IV., and a powerful advocate of reforms, which placed him in the height of popular favor. He was raised to the peerage and accepted the position of lord chancellor in the ministry of Earl Grey, with the title of Lord Brougham and Vaux. His able and eloquent opposition to slavery and his advocacy of progress caused the administration to be highly popular and resulted in the passage of the Reform Bill in 1832. With the dismissal of the Whig ministry in 1834, his official life ended, but he continued an active member of the House of Lords till some time later. Subsequently he became devoted to science and literature and published many excellent writings. He was regarded, next to Canning, the best orator of his time, and was commonly referred to as the "Demosthenes." Among his writings are "Speeches on Social and Political Subjects," "Lives of Men of Letters and Science," and "Life and Times of Lord Brougham."

BROWN, in painting, a dark color formed by a mixture of red and black, and then modified by a small addition of yellow. It belongs to the colors known as russets and olives, in which a black or a dark pigment modifies the hue. Umber, bister, and brown madder are among the brown pigments.

BROWN, Benjamin Gratz, public man, born in Lexington, Ky., May 28, 1826; died Dec. 13, 1885. He studied at the Transylvanian University and at Yale, and in 1850 began the practice of law at Saint Louis. In 1852 he was elected to the Missouri Legislature, serving until 1858, and during that time published a Republican newspaper, the *Missouri Democrat.* He raised a regiment for service in the Union army during the Civil War, and afterward commanded a brigade of militia. He was United States Senator in 1863-67, and in 1870 became Governor of Missouri. In 1872 he was candidate on the Greeley ticket for Vice President.

BROWN, Elmer Ellsworth, educator, born in Kiantone, N. Y., Aug. 28, 1861. He studied in the Illinois State Normal University and the University of Michigan, and subsequently took courses at the universities of Halle and Wittenberg, Germany. He was superintendent in the public schools a number of years, was professor in the University of Michigan in 1891, and the following year became connected with the University of California as professor of pedagogy. In 1893 he was made head of that department, in 1906 succeeded William T. Harris as commissioner of education for the United States, and was succeeded in that position by P. P. Claxton. He was elected to official positions in many scientific associations, including the International Congress of Arts and Sciences, in 1904. He published "Origin of American State Universities," "Making of Our Middle Schools," and "Secondary Education."



ELMER E. BROWN.

BROWN, George, statesman, born in Edinburgh, Scotland, Nov. 29, 1818; died May 9, 1880. He came to Canada at an early age and was a printer in the establishment of his father at Toronto. In 1844 he established *The Globe,* which was afterward converted into a daily paper, and later he founded the *Canadian Farmer.* He was elected to the Canadian Parliament in 1852, and formed the Brown-Dorion ministry in 1858, but resigned shortly after in consequence of a vote of want of confidence. In 1864 he became leader of the Conservatives, which position was held by him for some time. In 1873 he entered the Senate, and with Sir Edward Thornton negotiated a treaty with the United States. He died from the result of a shot by a discharged employé.

BROWN, Henry Billings, jurist, born at South Lee, Mass., March 2, 1836. He studied at Yale and was admitted to the Michigan bar in 1860. President Lincoln appointed him Assistant United States Attorney in 1863, and President Grant made him district judge in Michigan in 1875. He lectured upon admiralty law in the leading institutions, including the universities of Yale and of Michigan. In 1891 he became associate justice of the Supreme Court of the United States.

BROWN, Henry Kirke, sculptor, born in Leyden, Mass., Feb. 24, 1814; died in Newburgh, N. Y., July 10, 1886. He studied with Chester Harding in Boston and began to paint at an early age. At Albany, N. Y., he made portrait busts of several public men. In 1842 he went to Italy, where he traveled and studied four years, when he returned to New York and devoted himself to bronze casting. His principal productions are statues of Abraham Lincoln and General Nathaniel Greene; the latter is in the capitol at Washington. He executed equestrian statues of General Scott, General George Clinton, General Philip Kearny, and Richard Stockton. "The Seasons," "Ruth," and "The Pleiades" are well-known productions in marble. His works are regarded among the best produced in America, and some of them now adorn parks and public places in several important cities.

BROWN, Jacob, soldier, born in Bucks County, Pa., May 9, 1775; died Feb. 24, 1828. He started his career as a surveyor and school teacher, studied law in New York City, and served as military secretary to Alexander Hamilton. He entered the State militia of New York, became brigadier general in 1810, and fought against the British at Ogdensburg, Sackett's Harbor, Chippewa, Lundy's Lane, and Fort Erie, and for bravery received the thanks and a gold medal from Congress. In 1821 he was made general in chief of the United States army, which position he held until his death.

BROWN, John, author, born at Biggar, Scotland, Sept. 22, 1810; died May 11, 1882. After studying in the high school of Edinburgh, he entered the university in that city, where he was an apt and progressive student. He is famous on account of charming essays and stories well adapted to young readers. For some time he practiced medicine in Edinburgh, producing many of his writings at odd times. The most important include "John Leech and other Papers," "Majorie Fleming," "Spare Hours," and "Rab and his Friends."

BROWN, John, eminent abolitionist, born at Torrington, Conn., May 9, 1800; hanged at Charleston, Va., Dec. 2, 1859. He was a descendant of the Pilgrims who landed in the Mayflower, and was characterized by a spirit of sternness. At first he intended to engage in church work, but was compelled to give up that object on account of inflammation of the eyes. He engaged in the business of a tanner for twenty years, but lost much of his property by unfortunate speculation, and entered the wool trade in Ohio, in 1840. Being unsuccessful in business, he removed to New York nine years later to redeem a tract of land given him by Gerrit Smith, but returned again to Ohio after two years to resume the business of a wool dealer. He removed with his four sons to Kansas in 1855 and became prominent as an opponent of slavery. In the outbreak of the Kansas border troubles, then attracting attention, he took a prominent part and gained celebrity at Osawatomie by opposing marauding bands of proslavery men from Missouri. He soon conceived the idea of emancipating the slaves by providing them with arms and causing a general uprising against their oppressors. His first plan was to capture an immense stock of arms kept at Harper's Ferry, Va., for which purpose he collected a small force and seized the arsenal on Oct. 16, 1859.

On the morning of the next day he took the principal men of the town prisoners and awaited the uprising of the slaves, which did not materialize. Capt. Robert E. Lee, with a squad of United States soldiers, undertook to recover the arsenal, and succeeded in this on the morning of the 18th, after many recruits had gathered, and took Brown prisoner. He was taken to Charleston, Va., where he was convicted of treason and murder and condemned to be hanged. The sentence was carried out on December 2. His daring deed was an important link in the chain of events leading to the Civil War, and he became a hero in the songs of the northern armies, of which a favorite was "John Brown's Body Lies a Moldering in the Grave," and which is still popular. His life was written by F. B. Sanborn. It was published in 1885 under the title "Life and Letters of John Brown, Liberator of Kansas and Martyr of Virginia."

BROWN, John Calvin, soldier, born in Giles County, Tennessee, Jan. 26, 1827; died in Macon County, Aug. 17, 1889. After graduating from Jackson College in 1846, he studied law and traveled extensively through Eurasia and Africa. In 1860 he was elected to Congress on the Whig ticket. The following year he entered the military service of Tennessee as captain, but was soon made colonel of the regiment, and was transferred [illegible] the service of the Confederate States, where he was promoted to the rank of brigadier and afterward to that of major general. He commanded at Chattanooga in 1862, and participated in the engagements of Perryville, Murfreesboro, Chickamauga, Missionary Ridge, Kenesaw Mountain.

BROWN, John George. American painter, born at Durham, England, Nov. 11, 1831. He studied at Newcastle-on-Tyne and in Edinburgh, and came to New York City in 1853. Several of his productions won medals at Boston and San Francisco in 1877. He exhibited some of his paintings at the international expositions at Paris in 1889. He was an influential member of the Water Color Society for many years and was made its president in 1901. Among his most noted paintings are "The Country Gallants," "By the Sad Sea Waves," "Rustic Milliner," "Hiding in the Old Oak," and "Crossing the Brook." He died Feb. 8, 1913.

BROWN, Joseph Emerson, public man, born in Pickens County, South Carolina, April 15, 1821; died Nov. 30, 1894. He studied at Yale, where he graduated in 1846, and soon after took up the practice of law in Georgia, where he was elected to the State Senate in 1849. He was Governor of Georgia in 1857-65, and at the beginning of the Civil War seized the forts and the arsenal at Augusta, Ga. After the close of the war he advocated the reconstruction policy of the Republican party. In 1868 he was made chief justice of the State Supreme Court and supported Horace Greeley for President, and in 1880 became United States Senator, succeeding Gen. Gordon.

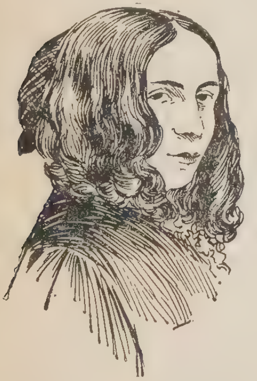
BROWN, Walter Folger, public man, born at Massillon, Ohio, May 31, 1869. He graduated at Harvard and took up the practice of law in Toledo, Ohio. In 1927 he became assistant secretary of commerce at Washington. President Hoover appointed him Postmaster General, in 1929, as successor to Harry S. New.

BROWNE, Charles Farrar. See **Artemus Ward.**

BROWNE, Sir Thomas, philosopher, born in London, England, Nov. 19, 1605; died Nov. 19, 1682. He studied at Oxford University and in Italy, and in 1633 was made doctor of medicine by the University of Leyden, Holland. He was a patron of literature and a student of the writings of Dante, and his works were widely translated. Charles II. knighted him in 1671. His books include "Urn Burial," "A Physician's Religion," and "Inquiries Into Vulgar and Common Errors."

BROWNE, Thomas Alexander, novelist, born in London, England, Aug. 6, 1826. He went to Australia at an early age, where he attended the Sydney College, and later became a pioneer in the development of Victoria. He was police magistrate and warden of Goldfields, New South Wales, and held other positions locally. His writings are numerous, including many that deal with life in Australia, and some of them hold a high place in the literature of that continent. They include "A Colonial Reformer," "A Modern Buccaneer," "A Canvas Town Romance," "The Babes in the Bush," "A Tale of the Golden West," and "Old Melbourne Memories." He died March 11, 1915.

BROWNING (broun'ing), **Elizabeth Barrett,** eminent poetess, born near Ledbury, England, March 6, 1806; died at Florence, Italy, June 29, 1861. She came from a family of good circumstances and great care was given to her in securing an education. At a very early age she gave proofs of genius. She wrote both in prose and verse at the age of ten, was able to read Homer in the Greek, and at fifteen her power as a writer became known to her friends. She possessed extremely delicate health from the first, and was injured by a fall from her pony, but her mind was vigorous and she enjoyed writing and well-directed physical exercises. Her first work was published in 1826, entitled "An Essay on Mind and Other Poems." Her father removed to London in 1835, where she established her reputation by publishing "The Seraphim and Other Poems." She was constantly in delicate health, and her physical condition was greatly weakened by the bursting of a blood vessel in the lungs. This, together with the shock caused by the accidental drowning, in 1840, of a favorite brother, made necessary her confinement in a sick room for a number of years and rendered her an invalid for a long time. Within this time she wrote a number of beautiful poems, including "The Cry of the Children."



ELIZABETH B. BROWNING.

In 1846 she married the poet Robert Browning (q. v.), though against the wishes of her father, and shortly afterward settled in Italy, where she resided the greater part of the time, making only occasional visits to her former home in England. The city of Florence was selected as her place of residence, where she continued busy in studying the works of art and the scenic beauties of Italian nature, which inspired her in writing many of her poetic productions. Among her best known and popular writings are "Prometheus Bound," "Lady Geraldine's Courtship," "Poems Before Congress," "Greek Christian Poets and the English Poets," and "Aurora Leigh." Perhaps the last named, a brilliant narrative poem, is her finest production, and has been admired by people speaking various languages. On account of her exquisite works she has been called the "Sister of Tennyson" and the "Daughter of Shakespeare."

BROWNING, Oscar, author and educational reformer, born in London, England, Jan. 17, 1837; died in Rome, Oct. 6, 1923. He studied at King's College, Cambridge, graduating with high honors in 1860. In the same year he became master at Eton, where he labored successfully for fifteen years, and in 1876 was made lecturer on history and political science at Cambridge. He was made examiner at the University of London in 1899. He is known in America chiefly by his work entitled "History of Educational Theories." Other publications include "Netherlands in the Sixteenth Century," "England and Napoleon in 1803," "The Citizen: His Rights and Responsibilities," "Wars of the Nineteenth Century," "Life of George Eliot," "Life of Peter the Great," and "Impressions of an Indian Travel."

BROWNING, Robert, celebrated poet, born at Camberwell, a suburb of London, England, May 7, 1812; died Dec. 12, 1889. He was educated at the London University and began early in life to write verses, many of which showed him to be a poetic genius. One of his best works was published in 1836, under the title "Paracelsus," a metaphysical drama, which was written when he was twenty-three years old. He married Elizabeth Barrett in 1846 and settled at Florence, Italy. In his poetic works he is ranked next to Tennyson. Charles Dickens regarded his "A Blot on the Scutcheon" the finest poem of the 19th century, and said of it that, if read once, it would haunt the imagination forever, for the reason that its power strikes very deep into the core and substance of the soul. His genius was essentially dramatic, and he showed a great love for compactness in expression. Shunning abstraction, he labored to make the ideal concrete. He left an only son, Robert Wiedman Barrett Browning, born at Florence in 1849, who attained renown as a sculptor and painter.

Browning was a prolific writer, producing very extensively. Though he was distinctly a realist, his writings are characterized by a spirit of optimism. He looked upon this life as a transitory state in which we are to become fitted for a fuller and larger life in the future. Among his most popular productions are "A Soul's Tragedy," "The Pied Piper of Hamelin," "How They Brought the Good News from Ghent to Aix," "Men and Women," "The Ring and the Book," "Aristophanes' Apology," and "Parleyings with Certain People of Importance in their Day." He also translated a number of Greek writings; the best known of these is his translation of "Agamemnon of Aeschylus."

BROWN-SÉQUARD (-så-kär'), **Charles Édouard,** physician, born in the island of Mauritius, April 8, 1818; died April 2, 1894. He was the son of an American sea captain from Philadelphia, Pa., and his mother was a French lady. In 1846 he graduated at the University of Paris, France, and was professor in the medical department of Harvard University in 1864-68. Subsequently he lectured in the Virginia Medical College, and in 1878 became professor in the College of France. He contributed to many scientific journals and is the author of a number of works on medicine. His best known work is "Archives of Scientific and Practical Medicine," published with Dr. E. C. Seguin. He originated the "Brown-Séquard Elixir," which he recommended as an injection to prolong and invigorate human life, but practical tests have shown that it possesses little if any value.

BROWNSVILLE, a city and port of entry in Texas, county seat of Cameron County, on the Rio Grande, opposite Matamoros, Mexico. It is on the Rio Grande Railroad, is surrounded by a stock-raising district, and has a large railroad and navigation commerce. Besides having good schools, it is the seat of Saint Joseph's College and Convent, a Roman Catholic institution. Among the chief buildings are the post office, county courthouse, customhouse, and town hall. It has manufactures of cigars, clothing, earthenware, and machinery. Electric lights and waterworks are among the public utilites. It was settled in 1848 and incorporated in 1853. In November, 1863, it was captured by the Federals under General Banks. Population, 1900, 6,305; in 1920, 11,791.

BROWN UNIVERSITY, one of the oldest educational institutions in the United States, founded in 1764 at Warren, R. I., and moved to Providence four years later. It has 25 buildings, 140 instructors, and about 2,100 students. Its productive fund is about $9,000,000, with an annual income of $1,250,000. The library has 300,000 volumes. Degrees in sciences, arts, and engineering are conferred. It is under the direction of the Baptist denomination, but the instruction is nonsectarian. The college known as the Woman's College of Brown University was established in 1891. Nicholas Brown, in whose honor the university was named, was its earliest benefactor.

BRUCE (brōōs), **Blanche Kelso,** public man, born in Prince Edward County, Virginia, March 1, 1841. He was born a slave, but received some education from the tutor of his master, and taught school after securing his freedom, at Hannibal, Mo. Afterward he attended Oberlin College. He held several county offices in Mississippi, where he settled after the war, and in 1875 was elected to the United States Senate and as a Republican. He served as a delegate to most of the national Republican conventions since 1868. Garfield appointed him Register of the Treasury in 1881, to which office he was again appointed by President McKinley in 1897. He ranks as an able speaker and as one of the most prominent American citizens of Negro descent. He died in 1898.

BRUCE, James, celebrated traveler, born in Sterlingshire, Scotland, Dec. 14, 1730; died April 27, 1794. He studied at Harrow and later at the University of Edinburgh, with the intention of adopting law as his profession, but engaged in the business of a wine merchant. In 1763 he was appointed consul general at Algiers. Subsequently he studied Oriental languages and the art of medicine, and entered upon a course of travel through Tunis, Tripoli, Alexandria, and Cairo, stopping for a time at Aleppo, Syria, for study. Later he ascended the Nile. In 1770 he reached Gondar, capital of Abyssinia, and afterward the source of the Abai, then thought to be the main stream of the Nile. He remained in Abyssinia two years, when he returned to Alexandria, exploring the desert of Assuan on his way back. He published five large volumes, entitled "Travels to Discover the Source of the Nile," in 1790. This work includes many interesting accounts of the habits and customs of the Abyssinians, together with their modes of life, architecture, industry, and form of government. Many of his statements were not believed at first, but they have been fully verified by recent explorers.

BRUCE, Robert, famous and heroic Scottish king, born March 21, 1274; died June 7, 1329. He was the eldest son of the Earl of Carrick, and early favored English interests with the hope that his father would be preferred for the Scottish throne. At first he swore fealty to Edward I., but later abandoned his cause, gathered vassals, and joined the Scottish army to aid in securing the independence of the country. The Scottish army was defeated a few months afterward and he made peace with the English monarch. He continued faithful to Edward I., giving valuable aid to that sovereign at different times. Later information reached him that Edward I. had decided upon his death and he became hostile, and in 1306 slew John Comyn, claiming the throne himself, upon which he was crowned king, but for many years retired to the mountains for safety, a portion of the time hiding in an island off the coast of Ireland. Later he joined his brother Edward and with him started to bring the country into subjection. He landed in Scotland, where he gained advantage because of the death of Edward and the unwarlike administration of his son, who had ascended the throne as Edward II. He won back advantage after advantage until June 24, 1314, when the Battle of Bannockburn was fought, which decided the independence of Scotland. He displayed extraordinary bravery in this decisive battle, which fired the hearts of his followers and caused the complete defeat of the English, although they outnumbered the Scotch about three to one. The war continued until 1323, when Edward was again defeated near Byland Abbey. Soon after a truce was concluded, but it was speedily broken. The independence of Scotland was not fully recognized until March 4, 1328. Bruce was twice married, his first wife being Isabella, daughter of the Earl of Mar. His second wife, Elizabeth, was a daughter of the Earl of Ulster. His first wife bore a daughter, Marjory, and his second wife, a son, David. The latter succeeded him to the throne as David II.

BRUGES (brụ'jĕz), an ancient city of Belgium, capital of West Flanders, about fifty-six miles northwest of Brussels and eight miles from the sea. It is known in history from the 3d century and was the center of the world's commerce in the 12th century, when it had a population of more than 200,000, and carried on an extensive trade with all the leading countries known at that time. It is inclosed within walls, has been the seat of great military contentions, and was an important factor in the history of the Middle Ages. It is now a railroad and canal center, commerce reaching it by the largest sea vessels through three canals which connect it with the sea. However, it has lost much of its importance, alike from the standpoint of commerce, manufactures, and population. There are numerous modern improvements, including fine schools, rapid transit, and several libraries. It has a remarkable tower 354 feet high, containing a set of excellent chimes. Other important structures include the palace of justice, the Hôtel de Ville, and the Church of Nôtre Dame. The last mentioned is in the early Gothic style of architecture and contains the tombs of Mary of Burgundy and Charles the Bold. In the art galleries are many paintings and sculptures, including productions by Jakob van Oost, Hans Memling, and Cornelius van Dyck. It was the residence of the printer Caxton. Besides commercial interests, the city has manufactures of textile goods, laces, ornamental work, and machinery. The shipbuilding yards and breweries are extensive. Bruges belonged to the Netherlands from 1814 until 1830. In 1914 it was captured by the Germans. Population, 1921, 54,870.

BRUMMELL (brŭm'mĕl), **George Bryan,** man of fashion, born in London, England, June 7, 1778; died March 29, 1840. He is best known as Beau Brummell, and became celebrated for the style of his dress and manner. He studied at Eton and Oxford, and was a companion of the Prince of Wales, afterward George IV., who bestowed military honors upon him. At the death of his father he inherited a large fortune, which he spent freely as a leader of fashion. In 1813 he had a quarrel with the Prince Regent and fled to Calais, France, where he afterward lost his mind and was confined to a lunatic asylum at Caen.

BRUNELLESCHI (brōō-nĕl-lâs'kē), **Filippo,** famous architect, born at Florence, Italy, in 1377; died April 16, 1446. He first studied the art of a goldsmith and afterward took up sculpture, but finally devoted himself entirely to architecture and to the revival of the ancient styles. His most remarkable product is the dome of the cathedral of Santa Maria del Fiore, Florence, the construction of which was intrusted to him after much discussion among architects. The cathedral was founded in 1296 and completed except the dome, which was proposed in 1420. He finished all but the lantern, which remained incomplete on account of his unexpected death. The dome is the largest in diameter in the world, and served as a model for Michael Angelo in building the dome of Saint Peter's. His other works include the churches of San Lorenzo and San Spirito, and the designs for the Pitti palace, from which the Tuscan Palace architecture of the 15th century originated.

BRUNETIÈRE (brün-tyâr'), **Ferdinand,** editor and critic, born in Toulon, France, July 19, 1849; died Dec. 9, 1906. He studied in his native city and at Marseilles and Paris, and in 1875 engaged as critical writer of the *Revue des Deux Mondes,* of which he became editor in 1895. He was chosen professor of literature in the Ecole Normale at Paris in 1886. The following year he was made a member of the Legion of Honor, and became lecturer at the Sorbonne in 1893. As lecturer he is well known in America, having made a tour of Canada and the United States in 1897. During the religious discussions of France in 1904, he was a zealous supporter of Roman Catholicism. His writings include many essays and works relating to ethics, politics, and sociology.

BRÜNN (brün), a city of Czecho-Slovakia, capital of Moravia, ninety miles north of Vienna. It is beautifully located at the confluence of the Zwittawa and Schwarzawa rivers, at the foot of Mount Spielberg, and is connected with Vienna and other cities by important railroad lines. The principal building is the Cathedral of Saint Peter and Saint Paul, built in the 15th century, and it has several other noted churches in the Gothic style. The manufactures embrace woolen goods, leather, chemicals, and machinery. A system of waterworks is owned and operated by the city. Many of the streets are substantially paved with stone and asphaltum. It is the seat of several schools and business colleges. The trade is chiefly in grain, live stock, cereals, and merchandise. Brünn was founded in the 9th century and became a free imperial city in 1278. Population, 1920, 125,008.

BRUNSWICK (brŭnz'wĭk), county seat of Glynn County, Georgia, on Saint Simon's Sound, twelve miles from the Atlantic Ocean, on the Southern and other railroads. It has a safe harbor and enjoys a growing navigation and railroad commerce. Among the chief buildings are the city hall, the post office, the county courthouse, and the Oglethorpe Hotel. The manufactures include furniture, canned oysters, ironware, flour, cigars, and machinery. The city has street railways, electric lights, and pavements. It is popular as a summer and winter resort. The first settlement was made by James Oglethorpe in 1735. Population, 1920, 14,413.

BRUNSWICK, a town of Cumberland County, Maine, on the Androscoggin River, and on the Maine Central Railroad. It has several fine schools and is the seat of Bowdoin College. The manufactured products include cotton goods, machinery, paper, flour, and leather. It has a public library, waterworks, street pavements, and a considerable trade. The first settlement was made in 1628, when it was known as Pejepscot, and it was incorporated in 1717 as Brunswick. Population, 1920, 5,840.

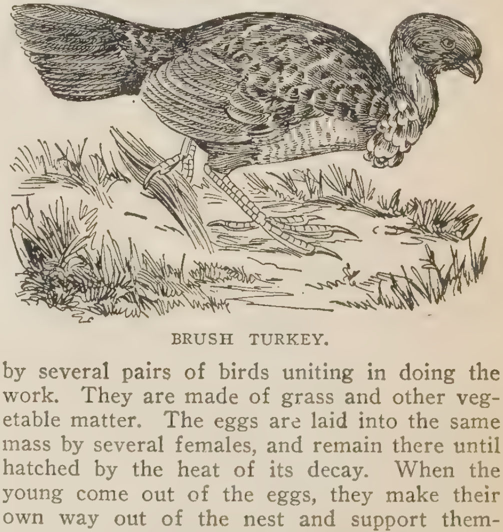
BRUNSWICK, an important city of Germany, capital of the duchy of Brunswick, on the Oker River, thirty-two miles southeast of Hanover. The principal buildings are the Church of Saint Magnus, built in 1031; Catharine's Church, 1172; the Cathedral of Saint Blaise, 1173; a Gothic council house; and the Gewandhaus. It is the seat of many fine schools, two museums, a public library, and a gymnasium. The manufactures include fabrics, machinery, clothing, sugar, and earthenware. Rapid transit, gas and electric lights, telephones, several parks, and waterworks are among the improvements. It was founded by Bruno, Duke of Saxony, in the 9th century and was enlarged by Henry the Lion. For many years it was an important member of the Hanseatic League of cities. A large majority of the inhabitants are Lutherans. Population, 1920, 143,534.

BRUNSWICK, Duchy of, a state in Germany, surrounded by the Prussian provinces of Saxony, Hanover, and Westphalia. It has an area of 1,418 square miles. It belongs mainly to the basin of the Weser River, but the southeastern part includes ranges of the Harz Mountains, which rise to an altitude of 3,000 feet. The inhabitants consist largely of Saxons. They are almost entirely Protestants, and engage in agriculture, mining, and commerce. The mines yield copper, lead, iron, and coal, while the agricultural products consist of cereals, vegetables, and fruits. Large interests are vested in rearing live stock, in dairying, and in growing sugar beets. The manufactured articles include beet sugar, tobacco, paper, soap, fabrics, wine, and leather. It is penetrated by many electric and steam railroads, the latter of which belong largely to the state system of Prussia. Its government is a constitutional monarchy, the duchy having two members in the national Bundesrath and three deputies in the Reichstag. In the time of Charlemagne the region was a part of Saxony, but it became independent in 1235. It was annexed to the kingdom of Westphalia by the Treaty of Tilsit, but again became independent in 1813. In 1866 it sided with Prussia, joined the German Confederation in the same year, and since 1871 it has been a part of the German nation. Brunswick, on the Oker, is the capital and largest city. Population, 1905, 485,958; in 1920, 494,387.

BRUSA (brōō'sȧ), or **Broussa**, a city of Asiatic Turkey, capital of a vilayet of the same name, about twenty miles from Mudania, its port on the Sea of Marmora. It is surrounded by a fertile plain, and in its vicinity are thermal springs noted for their medicinal properties. It has extensive manufactures of carpets and silk goods, which are exported to the commercial centers of Europe and Asia. It is a market for produce and merchandise and the seat of numerous mosques. Several sultans and Turkish nobles were buried in tombs in its vicinity. Brusa was founded by Prusias II., King of Bithynia, and anciently was known as Prusa. It was captured by Orkhan, son of Othman, the second Sultan of Turkey, in 1327, and made the capital of the Turkish empire, but later Amurath I. removed the capital to Adrianapolis. In 1402 it was captured and plundered by the Tartars. The inhabitants consist mostly of Turks. Population, 1923, 76,303.

BRUSH, Charles Francis, inventor, born in Euclid, Ohio, March 17, 1849. He graduated at the University of Michigan in 1869, and soon after established a chemical laboratory in Cleveland. Later he devoted his attention to electricity. He invented the dynamo electric machine known by his name, which is used extensively in arc lighting, and later patented an arc lamp used in a series for street and general lighting. He made various improvements in electrical machinery. In 1891 he received the decoration of the Legion of Honor in France. He died June 15, 1929.

BRUSH TURKEY, a large bird native to Australia, noted for the peculiar manner in which its eggs are hatched. The nests are built by several pairs of birds uniting in doing the work. They are made of grass and other vegetable matter. The eggs are laid into the same mass by several females, and remain there until hatched by the heat of its decay. When the young come out of the eggs, they make their own way out of the nest and support themselves. The brush turkey is about the size of a common turkey, and like it has wattles on its



BRUSH TURKEY.

neck and head. About twelve species belong to this family of birds, which are sometimes called *mound birds.* They are hunted for their flesh, and when pursued fly into the branches of trees or escape by running through tangled brush.

BRUSSELS (brŭs'ẹlz), the capital of Belgium, in the province of Brabant, on the Senne River. It is one of the most beautiful cities of Europe. Rapid transit, gas and electric lights, waterworks, and pavements are maintained. There are railroad connections with many of the principal cities of the continent, and it is the center of an important and growing commerce. The older part is located on the site of former fortifications and has crooked and ancient streets, while the newer portion has many substantial structures and contains the newer residences and public buildings. The king's palace, the palace of justice, the palace of chambers, the palace of fine arts, and the public library and museum rank among the finest structures of the kind in Europe.

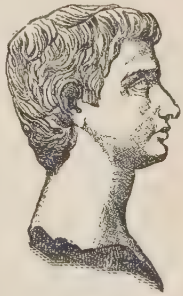
The city has many fine public boulevards, botanical gardens, and public parks, a number of which are adorned by monuments and statuary of prominent men. Its educational institutions include schools for all grades of instruction, and terminate in the University of Brussels. It has about 1,050 students. With it are connected an observatory, a conservatory of music, and a fine library. This library has over 400,000 volumes and 31,500 manuscripts. The city contains a large number of learned societies which maintain departments of Flemish art, and scientific and philosophic courses. Among the ancient buildings is the Cathedral of Saint Gudule, a fine structure in the Gothic style. The Hôtel de Ville, built in 1450, is in the Gothic style and has a spire 364 feet high, surmounted by a gilt statue of Saint Michael, the city's patron saint. There are several historic monuments, including the equestrian statue of Godfrey of Bouillon. The Grand Place and the Place of Martyrs are among its many noted squares.

The industries of the city consist, besides commerce, of manufacturing and jobbing. The production of lace, cotton and woolen goods, and machinery are important. It has large distilleries, foundries, sugar refineries, and breweries. Its lace production has long been important and its manufacture of Brussels carpets has given it and its suburbs renown. The language spoken is French, German, and Dutch. The appearance of the city is modern, although it dates back to the Middle Ages. In 1044 a wall was built around it by Baldric of Lauvain, in 1380 it was strongly fortified, and in the 15th century it was ravaged by the plague and twice damaged by fire. The French bombarded it in 1695 and conquered it in 1794. Under French occupation it became the chief city of the department of Dyle. In 1815, after the defeat of Napoleon, it was made the capital of the Netherlands. The Germans captured it in 1914 and held possession of it until 1918, when it was retaken by the Belgians. Pop., 1921, 691,580.

BRUTUS (brṳ'tŭs), **The Trojan,** a mythical personage, supposed to have been the first King of Britain. He is said to have been the grandson of Ascanius, the son of Aeneas, and accidentally killed his father, Sylvius. For protection he fled to Greece, and thence went to Britain, where he slew the giants that inhabited Albion and founded New Troy, or London. Each of his three sons, Locrine, Albanact, and Cumber, received territory in the island, which was divided into three districts.

BRUTUS, Lucius Junius, the Roman hero who overthrew monarchy and restored republican government. His history is mythical, but he is thought to have been the son of a rich Roman, whose property was taken by Tarquin the Proud during the time of the Etruscan dominion over Rome. His father and brothers were killed, while he escaped death by pretending idiocy. When one of the royal family had wronged Lucretia and aroused all Rome to indignation, he threw off the mask, convoked the people, and drove the kings from Rome. Rome now became a free city, after it had been governed by kings for 245 years. Two consuls were elected to rule, and Brutus and Collatinus were the first selected. His two sons plotted to bring Tarquin back, but Brutus, sitting in judgment when they were brought to trial, sentenced them both to death as traitors. He was killed in a battle with Aruns, son of Tarquin, in the year 509 B. C. His services to Rome were commemorated by the erection of a bronze statue with a drawn sword, and the matrons of Rome mourned him a whole year because he had so bravely avenged the wrong done to Lucretia.

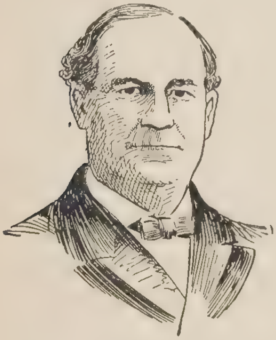
BRUTUS, Marcus Junius, celebrated Roman, born in 85 B. C.; suicided in 42. In early manhood he was devoted exclusively to literary pursuits and did not interest himself in the political discussions of Rome until he had attained a mature age. During the civil war between Pompey and Caesar he sympathized with the former, but after the Battle of Pharsalia he became friendly with Caesar and was made governor of Cisalpine Gaul, and later of Macedonia. After returning to Rome, he was divorced from his wife with the design of marrying Portia, daughter of Cato, of whom he was a supporter. Later he was induced by the aristocrats to join the conspiracy against Caesar, which ended in his assassination. However, the people were enraged at Caesar's death and Brutus fled from Rome and later from Italy.


MARCUS JUNIUS BRUTUS.

When his ultimate defeat became apparent, he fell upon his sword, which was held by his friend Strabo, and thus ended his life. In speaking of Brutus, Shakespeare alludes to him as "the greatest Roman of them all." Unhappily, this estimate of his life will not bear scrutiny.

BRYAN, Charles W., public man, born at Salem, Ill., Feb. 10, 1864. He graduated from the University of Chicago and removed to Lincoln, Nebr., where he served as secretary and business manager for his brother, William Jennings Bryan. In 1911 he took over the business management of *The Commoner,* a political periodical. Meanwhile he served successively as alderman, street commissioner and mayor of Lincoln. In 1922 he was elected governor of Nebraska with a large majority, in which office he promoted a policy of economy and conservation. He was nominated for Vice-President, in 1924, on the Democratic ticket with John W. Davis.

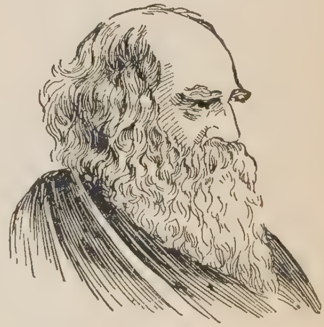
BRYAN, William Jennings, statesman, born in Salem, Ill., March 19, 1860. Silas L. Bryan, his father, was a lawyer and public man in Illinois, having served in the State Senate for twelve years and as a circuit judge. The subject of this sketch was educated at Whipple Academy, Illinois College, and the Union Law School of Chicago. He began the practice of law at Jacksonville, Ill., and in 1887 removed to Lincoln, Neb., where he entered the law firm of Talbot and Bryan. Here he developed an interest in current political issues and demonstrated remarkable ability as a thinker and speaker on economic questions. In 1890 and 1892 he was elected to Congress in a district in which the Republican party had a large majority, and while in that body became prominent as an advocate of reforms and as a worker and member of important committees. He became a prominent candidate for the Democratic nomination for President in 1896, and greatly impressed the convention at Chicago, in July, by an electric and perfervid oration, which was a factor in causing his nomination the next day.

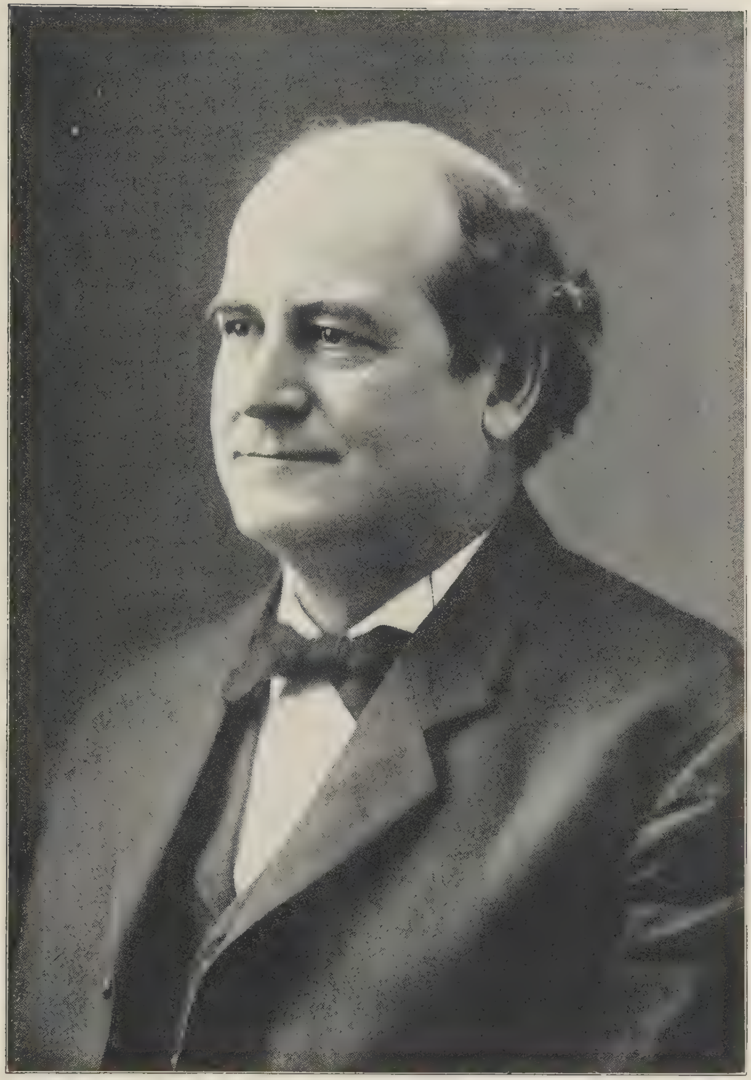

WILLIAM JENNINGS BRYAN.

Bryan received more votes than were cast for a presidential candidate previous to 1896, a total of 6,511,073, and the electoral votes of twenty-two states, but was defeated for the Presidency. Subsequently he devoted himself to lecturing from the lyceum platform and to institutions of learning, and before State legislative assemblies. The principal issue of the campaign of 1896 was that of bimetallism, and afterward he published a book relating to it, entitled "The First Battle." In 1899 he published "Republic or Empire," a discussion of imperialism and militarism. In the national convention at Kansas City, held July 4, 1900, he was again nominated for the Presidency, but was again defeated, receiving 6,342,514 of the popular votes and the electoral votes of seventeen states. In 1901 he established *The Commoner,* a weekly publication, at Lincoln.

He made a tour of the world in 1906, visiting the leading countries of Europe and Asia, and was received on his return to America with a great demonstration at New York, where he made an impressive speech in Madison Square Garden. Among other principles, he advocated placing on the free list all articles controlled by the trusts, the surrender of the Philippines, the passing of an income tax law, the election of United States senators by the people, and the bank guaranty bill. In 1908 he was nominated a third time for President at the national convention in Denver and was defeated by William H. Taft (q. v.). He continued to be influential in the affairs of the nation and in 1913 entered the cabinet of President Wilson as Secretary of State, but resigned in 1915. Subsequently he devoted his time largely to the lecture platform on educational topics, including Christian fundamentalism. He belongs to the *defeated presidents* of the nation, which include Daniel Webster, Horace Greeley, and James G. Blaine. He died at Dayton, Tenn., July 26, 1925.

BRYANT (brī'ant), **William Cullen,** poet and journalist, born at Cummington, Mass., Nov. 3, 1794; died in New York City, June 12, 1878. When only eight years old he began to write verses. His first work, entitled "The Advance of Knowledge," was published in 1805 in the *Hampshire Gazette.* He was educated at New Brookfield and Plainfield, Mass., and at Williams College, but left school in 1812 to study law, and was admitted to the bar in 1815. He practiced law at Plainfield and later at Great Barrington, where he was married to Frances Fairchild in 1821. In 1825 he left the legal profession and went to New York to assume the editorship of the *New York Review,* and later of the *United States Literary Gazette.* In 1826 he became a member of the staff of the *Evening Post,* and afterward was its proprietor and editor. He supported General Jackson in his opposition to the national banks, which greatly affected the prosperity of his paper and gave him high rank among political


WILLIAM C. BRYANT.



(Opp. 390) WILLIAM JENNINGS BRYAN.

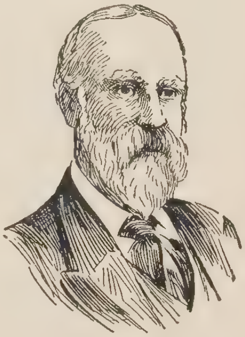
William Jennings Bryan passed away at Dayton, Tenn., July 26, 1925, and was buried in the Arlington National Cemetery at Washington, D. C.

writers of Jackson's time. The annexation of Texas and the war with Mexico met his opposition, and he became an active organizer of the Free Soil party in 1848 and of the Republican party in 1856, and was a presidential elector on the ticket with Abraham Lincoln in 1860. At the outbreak of the Civil War he advocated the emancipation of the slaves and was a devoted supporter of the Union.

Bryant made a number of visits to Europe for the study of language and literature. In this way he added greatly to his fund of knowledge and experience in producing valuable and interesting productions. His best poem, "Thanatopsis," was written in his eighteenth year and was first published in September, 1817, in the *North American Review.* His foreign letters, written while abroad, were perused with much interest by the American people. They were known as "Letters of a Traveler" and "Letters from Spain and Other Countries," both written while on foreign tours. He possessed facility of speech and delivered many impressive public addresses, including those at the banquet of Kossuth, at the Burns centennial, and at the Schiller festivities. Other great addresses include an oration on Goethe and the speeches made at the dedication of the statues of Morse, Shakespeare, Scott, and Halleck. These "Orations and Addresses," as they are known, were published in book form in 1873. He translated the "Iliad" and the "Odyssey," and published them in 1870-72. His last public address was delivered at the unveiling of the statue of Giuseppe Mazzini in Central Park, New York City, May 28, 1878, where he was overcome by the heat and greatly injured, from which he never recovered. Bryant was a poet of nature, his verse overflowing with the "religion of the woods," and his prose is touched with an exquisite grace. He ranks with Longfellow and Poe. His fault lies rather in writing too little instead of devoting his energies to large productions and bidding for an immortal fame. He is admired by many readers, and his works possess a degree of merit that gives them a growing popularity.

BRYCE (brīs), **George,** author and educator, born at Brantford, Ont., April 22, 1844. He was educated at the Brantford high school and the University of Toronto, and was awarded many prizes and medals for efficient work as a student. In 1870 he was made examiner in natural history at the University of Toronto, and the following year was sent by the general assembly of the Presbyterian Church of Canada to organize a church and college at Winnipeg, where he established the Knox Church and Manitoba College. He is one of the founders of the University of Manitoba, which was established in 1877, and in this institution he was examiner in science from that year until 1904, when he became chairman of the faculty of science. He has been influential and successful in home missionary work, having organized seventy churches, and was moderator of the general assembly of the Presbyterian Church in Canada, in 1902-03. In 1905 he was made president of the Historical and Scientific Society of Manitoba. Among his chief writings are "The Apostle of Red River," "Manitoba: Infancy, Progress, and Present Condition," "The Makers of Canada," and "Remarkable History of the Hudson's Bay Company."

BRYCE, James, author and statesman, born in Belfast, Ireland, in 1838. He studied at Glasgow and Oriel College, Oxford, and in 1870 became regius professor of civil law at Oxford University, in which position he served successfully until 1893. His political life began in 1880, when he was elected a member of Parliament as a Liberal. In 1886 he was made under-secretary of state for foreign affairs, and was given a seat in Gladstone's cabinet in 1892. He was not only conspicuous as a Liberal leader and as a follower of Gladstone, but took a prominent part in the agitation for home rule in Ireland, and advocated international copyright and a complete revision of the statute law. In 1905 he became chief secretary for Ireland, in the ministry of Sir Henry Campbell-Bannerman. He was appointed ambassador to the United States in 1906. His best known publication is "The American Commonwealth," for which he collected material during three visits to the United States. Other books include "Impressions of South Africa,' "Transcaucasia and Ararat," "The Holy Roman Empire," and "The Flora of the Island of Arran." He died Jan. 22, 1922.


JAMES BRYCE.

BRYN MAWR COLLEGE (brĭn mär), an educational institution at Bryn Mawr, Pa., about five miles west of Philadelphia, on the main line of the Pennsylvania Railroad. It was founded for the education of women by Joseph W. Taylor, a member of the Society of Friends, and opened in 1885. The grounds include a plot of fifty-two acres, laid out in lawns, and beautifully fitted with tennis courts, hockey grounds, and an athletic field. The college buildings are of gray stone in the Jacobean-Gothic style of architecture. In the library building, completed in 1907, are 98,500 bound volumes and 8,000 pamphlets. Full graduate and undergraduate instruction is offered in Greek, Latin, English, German, and other modern languages, and in Sanskrit, history, political science, philosophy, mathematics, physics, geology, chemistry, and biology. Numerous competitive matriculation scholarships are awarded annually. It has a fund aggregating about $6,238,865. Undergraduate students are admitted by examination. The faculty consists of seventy professors and instructors, who are carefully selected for the particular work assigned to them, and the students in attendance number about 525.

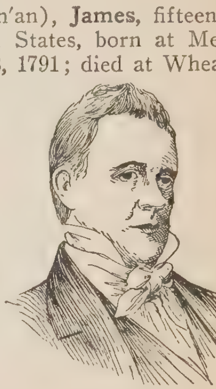
BRYOPHYTES (brī'ō-fīts), one of the four divisions of the plant kingdom, including the members which do not produce flowers. It is divided into two divisions, one including the mosses and the other the liverworts. The former have a vertical axis and a leafy body, while the latter have a horizontal axis and a thalloid body. These plants do not have true roots, and propagate largely by spores and a class of cells known as *elaters*. See **Mosses.**

BUBASTIS (bū-băs'tĭs), or **Bubastus,** an ancient Egyptian city, situated in the delta of the Nile, now ruined and called Tel Bast. It was so named from the goddess Pasht, whose festivals were the most important celebrated by the Egyptians. The ruins excavated show that the city had magnificent temples, solid fortifications, and extensive baths. It was the seat of a great commerce and the center of much wealth.

BUBONIC PLAGUE. See **Plague.**

BUCCANEERS (bŭk-kȧ-nērz'), a celebrated association of pirates who plundered the West Indies and the Spanish colonies of South America from the 16th to the end of the 17th century. They consisted mostly of French and English. Their occupation was largely that of seafaring people, and they united by common enmity against the arrogant pretensions of the Spaniards. They were first fortified on the Tortugas Islands, off the southern coast of Florida, but later divided, when the French established themselves in San Domingo and the English occupied Jamaica. The chief leaders of the French were Montbar, known as the exterminator, and the Welshman, Henry Morgan. They adopted a code of laws for their government and organized in bands to plunder the Spanish vessels as they returned from Europe to supply the colonies with provisions and manufactured articles. In 1670 they made attacks upon Panama, where they defeated the Spanish troops and secured considerable booty. They took possession of Vera Cruz in 1683, carrying off booty valued at $2,500,000 and 1,200 slaves. Later Morgan became deputy governor of Jamaica, and for many years was a terror to navigation and the early settlements. In 1697 Cartagena was taken and prizes valued at $8,000,000 were secured by the buccaneers. At the beginning of the 18th century they were lost sight of as common pirates and subsequently were exterminated or conquered.

BUCEPHALUS (bū-sĕf'ȧ-lŭs), the horse purchased for Alexander the Great in Thessaly, and which was his favorite steed in all his campaigns. It is said to have cost sixteen talents, about $20,000. It died in India from the effects of wounds received in a battle about 326 B. C., and the great commander built the city of Bucephala in its honor.


JAMES BUCHANAN.

BUCHANAN (bŭk-ăn'an), **James,** fifteenth President of the United States, born at Mercersburg, Penn., April 23, 1791; died at Wheatland, June 1, 1868. He was the son of a Scotch-Irish farmer who settled in America in 1783. His education was secured in Mercersburg and at Dickinson College, Pennsylvania, where he graduated in 1809. He entered upon the practice of law at Lancaster, Pa., in 1812. His first public address was made at the age of twenty-three on the occasion of a popular meeting in Lancaster, after the British had captured Washington in 1814. He was twice elected to the Legislature of Pennsylvania, beginning in 1814, and to Congress in 1820, and remained in the House of Representatives ten years; in the second administration of Monroe, the administration of John Quincy Adams, and two years of Jackson's administration. He was a personal friend and a strong supporter of Andrew Jackson, and was appointed by him to the Russian mission, in which position he negotiated an important commercial treaty with that country. In 1834 he was elected to fill a vacancy in the United States Senate, which position he held three terms consecutively, declining the office of Attorney General, tendered him by President Van Buren in 1839. He became Secretary of State at the beginning of Polk's administration, and during his incumbency in that office he displayed much skill in settling the boundary dispute between Oregon and the British possessions and in the annexation of Texas, which resulted in the Mexican War.

When Taylor succeeded to the Presidency, Buchanan retired from official life for a time, but became an unsuccessful candidate for the nomination for President before the national Democratic convention in 1852. President Pierce appointed him minister to England and recalled him in 1855, two years later, at his own request. He was nominated for President in 1856, receiving 174 electoral votes, 114 being cast for John C. Fremont and eight for Millard Fillmore, and refused the use of his name for renomination in 1860. As President he was a strong supporter of slavery and State sovereignty, holding that a State had the right to withdraw from the Union when it saw fit to do so. In his administration a threatened rebellion in Utah by the Mormons was peaceably settled, the outbreak of the Civil War was delayed on the election of Abraham Lincoln, and considerable advantage was given to the Confederacy by permitting the seizure of arms and ammunitions of war. He wrote an account of his administration, under the title "Mr. Buchanan's Administration on the Eve of the Rebellion." It constitutes a defense of his policy as President and was issued in 1866.

BUCHANAN, Robert William, writer of poetry and prose, born in Staffordshire, England, Aug. 18, 1841; died Jan. 10, 1901. He was educated at Glasgow University and went to London at an early age. In 1863 he published his first work, "Undertones," but his first distinction was secured by "London Poems," three years later. His writings give evidence of great versatility as a critic, novelist, essayist, and dramatist. His range of subjects is quite extensive. Among his productions are "Ballads of Love," "Life and Humors," "Napoleon Fallen," "God and the Man," "The Child of Nature," and "Martyrdom of Madeline." "The Wandering Jew," published in 1893, is considered one of his best productions.

BUCHAREST (bo͞o-kȧ-rĕst'), capital of Rumania and of the principality of Wallachia, on the Dimbovitza River, a tributary of the Danube. The chief buildings include the town hall, the royal palace, the university, and the palace of justice. Germans and Hungarians control the larger commercial interests. The city ranks as one of the largest centers of the Balkan peninsula. It has extensive manufactures, railroad facilities, a public school system, and a number of splendid edifices, although it does not hold a high place in learning and culture. Its principal growth and improvements date since the war between Russia and Turkey in 1878. Within recent years electric lights, telephones, and rapid transit have been introduced. Bucharest was founded in the 13th century by Radul the Black, of Transylvania, after the conquest of Wallachia. In 1595 it was captured by the Turks under Linan Pasha, and became prominent in European history in the early part of the 18th century. It was occupied by the Russians in 1828, taken by the Austrians in 1857, and made the capital of Rumania in 1861. The city was captured in 1916 by an Austro-German army. Population, 1923, 348,742.

BUCK, Dudley, musical composer, born at Hartford, Conn., March 10, 1839. He studied at Trinity College and at the Leipzig (Germany) Conservatory of Music. Later he was instructed by Richter, Hauptmann, and Schneider, and for several years resided in Chicago. He was organist of the Music Hall, Boston, and of the Holy Trinity Church, Brooklyn, and served as organist of the Apollo Club. In 1876, at the inauguration of the Centennial Exposition, Theodore Thomas directed the performance of one of his cantatas, and in 1880 he was awarded the prize offered by the Cincinnati Music Festival for the best cantata. Among his chief productions are "The Light of Asia," "Golden Legend," "The Centennial Meditation of Columbia," and "O Peace! On Thine Upsoaring Pinions." He died Oct. 6, 1909.

BUCKBOARD (bŭk'bōrd), a light vehicle with four wheels, so named because of its bucking or bouncing. It has a floor or platform of elastic boards, attached to the crossbar in front, fastened to the axle with a bolt, and connected with the hind axle by small bolts or rivets. This vehicle may have one or two seats, though a one-seated buckboard is the most common. It is a good conveyance for rough and rocky ground, and came into use when the Adirondack region was first visited as a resort.

BUCKEYE (bŭk'ī), the American horse chestnut. It is found widely distributed in the Mississippi valley, where it attains a large size. The tree has small flowers, strongly scented bark, and bears considerable quantities of large nuts in a prickly inclosure. Owing to its general prevalence in Ohio, that State is called the Buckeye State, and the inhabitants are known as Buckeyes. See **Horse-chestnut.**

BUCKINGHAM (bŭk'ĭng-am), **George Villiers, Duke,** born in Leicestershire, England, Aug. 20, 1592. He was the son of an English nobleman, a favorite of James I. and Charles I., and attained to much wealth and power under the Stuarts. In 1623 he accompanied Prince Charles, afterward Charles I., in his suit for the Infanta of Spain with the hope of securing a dowry. The mission proved unsuccessful, owing to the arrogance of Buckingham, and involved England in a war with Spain. In 1625 he went to France as proxy for Charles I. to marry the Princess Henrietta Maria. The following year he was impeached on account of the Cadiz expedition, but remained safe in the favor of the king. His unpopularity involved England in war with France, and finally led to his assassination on Aug. 23, 1628.

BUCKINGHAM, William Alfred, war Governor of Connecticut, born at Lebanon, Conn., May 28, 1804; died Feb. 3, 1875. He engaged in manufacturing enterprises at Norwich, where he was elected mayor four terms. He served as Governor of the State from 1858 to 1866, and in the United States Senate from 1869 until his death. During the latter part of his life he took much interest in promoting the cause of temperance. Yale Theological Seminary received a gift of $25,000 from him.

BUCKINGHAM PALACE, a palace in London, England, one of the residences of the royal sovereign. It is located opposite Saint James's Park, and was built in the reign of George IV.

BUCKLAND (bŭk'land), **Cyrus,** inventor, born in Manchester, Conn., Aug. 10, 1799; died Feb. 26, 1891. He became interested in mechanical pursuits at the age of twenty-one, entered the United States army at Springfield, Mass., in 1828, and made a number of valuable inventions useful in the manufacture of arms. On retiring from the service, in 1859, Congress voted him $10,000.

BUCKLAND, Francis Trevelyan, naturalist, born in England, in 1826; died Dec. 19, 1880. He was educated at Christ Church College, Oxford, studied medicine, and was surgeon at Saint George's Hospital, London. In 1865 he established an institution for promoting fish-culture at South Kensington, which was afterward enlarged into the International Fishery Exhibition. His writings include "A Familiar Book of British Fishes," "Fish Hatching," "Curiosities of Natural History," and "Log Book of a Fisherman and Zoölogist."

BUCKLAND, William, distinguished geologist, born in Devonshire, England, in 1784; died Aug. 14, 1856. He was educated at Oxford, where he afterward became distinguished for his researches and lectures on geology and mineralogy. He produced many able writings on those subjects and published several books. Besides lecturing at Oxford, he was prominent in an official capacity in several noted associations. His son, Francis Trevelyan Buckland (q. v.), became a noted naturalist.

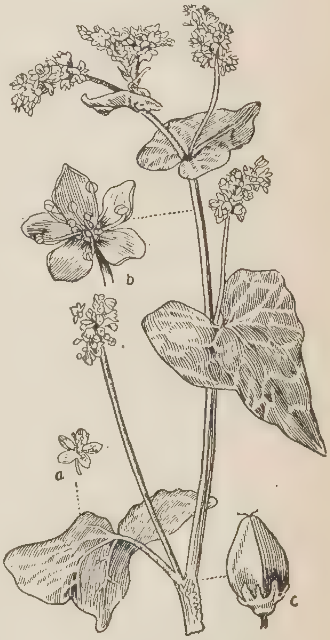
BUCKLE (bŭk'k'l), **Henry Thomas,** historian, born in Kent, England, Nov. 24, 1821; died May 29, 1862. He inherited a fortune from his father, who was a merchant and shipowner, and devoted himself to the study of science and history. His private library was one of the finest in England. In 1861 he went on a tour to Asia and died at Damascus. His chief work is a philosophic production entitled "History of Civilization in England."

BUCKNER (bŭk'nẽr), **Simon Bolivar,** soldier and statesman, born in Kentucky in 1823. He graduated at West Point in 1844, where he became instructor in ethics in 1846 and of infantry tactics in 1848. He served with distinction in the Mexican War, and joined the Southern army at the outbreak of the Civil War, surrendering to General Grant at Fort Donelson Feb. 16, 1862, with 16,000 troops. Following this he was imprisoned in Boston Harbor, but later was exchanged, when he joined General Bragg's army. He rendered services at Murfreesboro and Chickamauga, and surrendered at the close of the war to General Canby at Baton Rouge. He was elected Governor of Kentucky in 1887 as a Democrat. The dissenting wing of the Democratic party nominated him for Vice President, with Senator Palmer of Illinois for President, at Indianapolis, in 1896, on a single gold standard platform, but the ticket failed to carry any state. He died Jan. 8, 1914.

BUCKTAILS, a name familiar in the politics of the State of New York, which originated from the fact that the members of the Tammany Society wore bucks' tails as badges. It came into use about the time of the War of 1812, when the Democratic party was divided into two factions, one headed by James Madison and the other by De Witt Clinton, who were rival candidates for President. When Clinton was elected Governor of New York, in 1816, those who opposed him were known as Bucktails and his supporters were called Clintonians. The Bucktails gained control of the Democratic State organization under the leadership of Martin Van Buren, and the State administration was styled "Albany Regency."

BUCKTHORN (bŭk'thôrn), the name of a class of shrubs and trees common to Europe and America. The common buckthorn has serrated leaves and produces a berrylike drupe, containing seedlike nutlets. The berries are used as a cathartic, and the bark is employed in medicine and for making a yellow dye. The wood yields a light charcoal used in making gunpowder. Many species of this class of plants have been described. The *alder buckthorn* is common in Southern Europe, and grows to a height of from six to ten feet.

BUCKWHEAT, a plant native to Eastern Europe and Central Asia. It was first brought to Western Europe by the Crusaders and is now extensively cultivated in many countries. Buckwheat is grown quite extensively in the United States and Europe, owing to its ability to yield abundantly without much attention, even on stingy soil. The seed weighs about forty-eight pounds per bushel, and forty bushels per acre is a fair crop. It flowers profusely, is a favorite plant for the honey bee, and is cultivated largely to feed bees. In Europe the seed is ground into flour and used for gruel, breakfast cakes, and bread. In Canada and the United States it is used extensively for cakes, which are considered a great delicacy for breakfast. The annual production in the United States aggregates 14,750,000 bushels, New York and Pennsylvania producing about two-thirds of the total yield. Canada is peculiarly fitted for the cultivation of buckwheat. Ontario, where the production is largest, has an annual output of about 2,750,000 bushels.



BUCKWHEAT.
a b, flowers; *c*, seed.

BUCYRUS (bū-sī'rŭs), county seat of Crawford County, Ohio, on the Sandusky River, about sixty-five miles north of Columbus. It is on the Pennsylvania and other railroads, and is surrounded by a fertile farming country. The chief buildings include the county courthouse, the high school, and the city hall. It has manufactures of brick, wagons, and machinery. In its vicinity are a number of valuable mineral springs. Many of the streets are paved with vitrified brick. It was first settled in 1818 and incorporated in 1829. Population, 1900, 6,560; in 1920, 10,425.

BUD, the germ of the future leaves, branches, or flowers of plants. When large enough to have its parts distinguishable, it is seen that the bud is formed of undeveloped leaves. Large buds that are to remain over winter are covered by protecting scales, within which the life of the plant is stored, much the same as the embryo in seeds. The plumule of the embryo is a bud that makes the main stem, which is carried on year after year by a bud called the *terminal bud.* The buds that are to form the branches appear on the side of the stem, at the axils of the leaves, and are called *axillary buds.* The leaf buds contain the rudiments of the leaves and are classed as *leaf buds* and *flower buds,* the flower being a modified leaf bud. Some of the lower animals propagate themselves by buds.

BUDAPEST (bo͞o′då-pĕst), the largest city and the capital of Hungary, the second largest city in the former empire, located on both sides of the Danube River. It was the imperial capital of the kingdom of Hungary, and as one of the capitals of the dual empire it was of minor importance, since only the two delegations met alternately here and at Vienna. Its name was derived from Buda and Pesth, formerly two cities, but since 1873 united as one municipality. The two parts of the city are united by many bridges across the Danube. It is the seat of an imperial residence, has excellent transportation facilities by the Danube River and a large number of important railroad lines, and is the center of a vast commercial trade. It ranks as one of the important cities of Europe, being a center of wealth, industry, and intelligence.

The electric street railway system is one of the finest in the world, which has, instead of trolley wires, conduits between the tracks from which the power is gathered off metal strips, and lines are operated on all principal streets. Andrassy Strasse, one of the thoroughfares, has an underground road. It is one of the most beautiful streets in the world, containing stone pavements and having tall and well constructed buildings on both sides. The new house of parliament is an excellent structure, and, besides it, there are the Jewish Synagogue, the Leopold Basilica, a magnificent royal palace, excellent public schools, and other buildings devoted to higher education, including colleges and universities. The library contains 480,000 volumes and 65,000 manuscripts. There are well improved boulevards, public baths, and healthful mineral springs. The botanical gardens and public parks are among the most beautiful, while its promenades and stone quays along the river are delightful. The University of Budapest has 250 lecturers and professors and is attended by over 5,000 students.

The chief manufactures consist of gold, silver, copper, and iron wares, leather, silk, and woolen goods, tobacco, beverages, and machinery. It is one of the largest milling centers of the world, and in this respect has long ranked second to Minneapolis, Minn. Its sulphur springs have attracted health seekers and excursion parties from all parts of Europe, thus rendering the city a gathering place for many visitors to its baths, as well as to its libraries and institutions of learning. The language spoken is largely German, but the city has a considerable Bohemian and Hungarian population. Buda for many years contained the larger population, but was surpassed by Pesth in 1799, since which time the latter has greatly outgrown Buda in every respect. At that time the two cities contained a total population of a little over 50,000. Buda was known to the Romans as Aquincum. It was made the capital of Hungary by Matthias Cörvinus in 1444. Pesth was founded by the Germans in the 13th century. It became the capital of Hungary after the *Ausgleich* of 1867. Since 1873 they have been united as one municipality. Population, 1905, 798,692; 1922, 890,731.

BUDDHA (bo͞od′då), the founder of Buddhism. He was of Aryan descent, son of the King of Kapilavastu, an ancient kingdom about 100 miles north of Benares. His family name was Gautama and his personal name Siddhartha, and is often called Sakya-Muni or Saint Sakya, meaning a sainted sage. The Chinese call him Fo, which is the name Buddha. The Aryan invaders of India were unfavorable to the religion of the Brahmans and developed the system of castes to keep their blood uncontaminated. Buddha possessed great human sympathy, broke through the restraint of castes, and though himself an Aryan, he preached the equality of races, a doctrine which was at once embraced by the oppressed Turanians. Some writers place his birth at 622 B. C., and assign his attaining to Buddhahood to the year 580. His death is placed at 543, though some writers assign his death to about 400 B. C. Buddha did not deify himself, but was assigned to that high rank by his admiring followers. He is represented as a thoughtful personage. His father married him to a charming princess and surrounded him with wealth and splendor in order to prevent him from following a religious life. However, he became accustomed to meditate regarding old age, sickness, death, and the unknown eternity. He engaged in a strict religious life after twelve years. At the age of thirty he cut off his long locks, studied the religion of the Brahmans, and attained to much knowledge and skill in religion and history. His conclusion was that ignorance is the cause of evil, and to get rid of it is to attain to perfection, thus becoming freed from all misery. He first preached his gospel at Benares, but later traveled for forty years in North India, where he gathered many converts and established a vast following. See **Buddhism.**

BUDDHISM (bōōd'dĭz'm), the system of faith introduced or reformed by Buddha. It was effective in counteracting the caste system of the Brahmans and other Aryan invaders of India, and therefore fitted to become the religion of the Turanians. It existed in India as the principal religion for more than a thousand years, but has been almost entirely supplanted by Brahmanism. At present it is the religion of Ceylon, China, Japan, Tibet, and Burmah, and is the great Turanian faith of the modern as of the ancient world. It has existed for more than 2,500 years and numbers as its followers from one-tenth to one-eighth of the entire human race. One of its most prominent doctrines is that *Nirvâna,* a state of absolute release from existence, is the highest good. It is held that pain is inseparable from existence, thus it can cease only through Nirvâna; and, to attain to this state, our desires and passions must be suppressed and the most extreme self-renunciation practiced, while personality must be entirely subordinated.

The principles of Buddhism are stated in the so-called *Four Great Truths,* namely: 1. That misery always accompanies existence; 2. That all modes of existence result from passions or desires; 3. That there is no escape from existence except by destruction of desire; 4. That this may be accomplished by following the fourfold way to Nirvâna. The four stages, called *the passes,* begin with the awakening of the heart, called the first; in the second stage one loses all impure desires and revengeful feelings; in the third, one becomes free from all evil desires, from ignorance, from doubt, from heresy, and from unkindliness and vexation; the fourth stage is that of Buddha, or the perfect state. Among the laws of the faith are those that require fundamental virtues to be practiced by all men alike, including patience, courage, purity, charity, contemplation, and knowledge. The five fundamental precepts of the moral code are these: Do not kill; do not steal; do not commit adultery; do not lie; do not give way to drunkenness. The greatest virtue is benevolence.

Nirvâna is not reached until all the conditions necessary have been complied with. If these conditions have not been met with at death, an individual does not attain rest until he is fitted for Nirvâna. In that case he is born again as a person, a plant, a spirit, an animal, an insect, or as some other animated organism, from which state his soul transmigrates again and again until Nirvâna is eventually reached. In outward form Buddhism resembles some of the Christian churches in at least a few respects. The priests wear dresses and caps, construct monasteries, hold to celibacy, use bells, practice incense, use the rosary of beads, have lighted candles at the altar, have intonations in the service, believe in a purgatory, offer prayer for departed spirits, and pray in an unknown tongue. However, there is no similarity between the two faiths. The original teachings of the founder have been perverted and distorted by a number of disciples in various ages, and now lack many virtues formerly common to the faith.

BUDDING, a form of grafting in which a leaf bud is used instead of a young shoot. It is preferred for plants that throw out much gum when wounded, as the cherry, peach, plum, and apricot, and also for roses and flowering shrubs. It is done by cutting a bud from one plant and inserting it in some species closely allied. The bud is inserted into an incision, shaped like the capital T, in the stock of the allied tree, and then tied round by a ligature of matting. See **Grafting.**

BUDGET, a general financial statement which comprehends the proposed measure of expenditures for the ensuing year. In 1926 President Coolidge recommended to Congress that a budget system be adopted by the United States with the view of lowering taxes, increasing certain receipts, and reducing the national debt. This system worked very satisfactorily in 1928 and 1929. The estimates for 1930 placed the receipts at $3,841,295,829 and the expenditures at $3,780,719,647, indicating a surplus of $60,576,182.

BUELL (bū'el), **Don Carlos,** military officer, born near Marietta, Ohio, March 23, 1818; died Nov. 19, 1898. He graduated at the United States Military Academy in 1841, became first lieutenant in 1846, and won the brevet of captain at Monterey and that of major at Contreras and Churubusco, where he was slightly wounded. After the Mexican War he became an officer at Washington, where he remained until 1861, when he was appointed brigadier general and assigned to a division of the army of the Potomac. The department of Cumberland being organized as that of Ohio, he was placed in command and accumulated a splendid army of 100,000 men. In 1862 he became major general of volunteers and operated with Major General Halleck in the South. He came to the aid of General Grant at Shiloh and succeeded in pressing Beauregard toward Corinth.

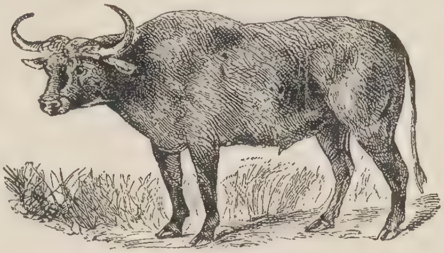
BUENA VISTA (bū'nȧ vĭs'tȧ), a small town in northeastern Mexico, in the state of Coahuila, noted for a celebrated battle between the American forces under General Taylor and the Mexicans under General Santa Anna. It was fought on Feb. 22 and 23, 1847, and the Mexicans were totally defeated, owing to poor generalship. The American army numbered 4,767 and the Mexican 17,000. The American loss was 648, while the Mexicans lost nearly 2,000.

BUENOS AYRES (bō′nŭs ā′rĭz), an important city of South America, capital of Argentina, on the La Plata River, 160 miles from the ocean. The city is built on a modern plan with regular streets crossing each other at right angles. It is one of the most important trade centers south of the equator, and enjoys a large oceanic commerce. It is connected with the interior cities of South America by numerous railroads. The river is thirty-six miles wide at the city, and quite shallow, but has been improved for all classes of navigation by a vast system of harbor works. In 1927 alone the sum of $20,000,000 was appropriated for harbor improvements, which has been expended to fit its wharves and dry docks for the largest vessels.

The city contains a general school system for free attendance, several colleges, and a central university with higher courses of study. The university is one of the best in South America and is attended by about 8,650 students. It is the seat of a fine cathedral, the Chapel of Santa Felicitas, a military college, the public mint, and government offices. The congress hall stands in a fine plot of sixteen acres and was erected in 1887 at a cost of $8,000,000. About 200 periodicals are published in the city, principally in the Spanish, but a number in the French, German, English, and Italian languages. It has several normal schools, a number of medical colleges, and a public library of 50,000 volumes. The city has 150 miles of electric street railway lines and extensive telephone systems, and is connected by cable communication with Europe and the United States. There are substantial stone and asphalt pavements, waterworks, several parks, and gas and electric lights.

The exports and imports are enormous, amounting annually to about $285,500,000. They consist largely of live stock, tallow, hides, cereals, fruits, tobacco, and minerals. The manufactures are expanding rapidly, being stimulated both by local and European capital. Among the chief products are carpets, furniture, cigars, clothing, textiles, boots and shoes, machinery, musical instruments, and other articles of commerce. The city was founded in 1535 by Don Pedro de Mendoza. It was twice destroyed by the natives, but has grown steadily since 1580. In 1851 it seceded from Argentina and organized as a separate state, remaining independant until 1859, when it rejoined the Republic and became its capital. Population, 1906, 1,029,653; in 1927, 2,510,460.

BUFFALO (bŭf′fá-lō), an oxlike animal with long horns, found native in Asia and Southern Africa. The Asiatic buffalo is still found in a wild state in the jungles of India. From it the domestic kind now largely bred in Eurasia descended. It has short hair, is brown on the back with a black head, and attains a height of seven feet. It is a better beast of burden than the ox, and the female yields a greater quantity of milk than the common domestic cow. In the wild state it is vicious, but when thoroughly domesticated it becomes gentle and docile. A species of this animal found in the Philippines is known as the *carabao*. The *Cape Buffalo,* found in South Africa, is larger than the Asiatic. It is famous for its vast horns, which start from a great bony mass at the head and often measure six or seven feet from point to point. The hide of the buffalo is useful for boots and shoes, while the meat is regarded a wholesome article of food. In India these animals are trained for exhibition and used for dairying. The buffalo is fond of marshy places and seems to enjoy standing in the water during the warm days with only its head projecting. See **Bison.**


CAPE BUFFALO.

BUFFALO, the second city of New York, county seat of Erie County, at the eastern end of Lake Erie and at the head of the Niagara River. It is 20 miles above Niagara Falls and 410 miles by rail northwest of New York City. Fifteen great trunk lines of railway center at Buffalo, including the most important railroads of the eastern part of the United States and Canada, and it has additional transportation facilities by the Erie Canal, the Great Lakes, and urban and interurban electric railways. Among the chief railways are the New York Central, the Wabash, the Erie, the Grand Trunk, the Pennsylvania, the Lackawanna, and the Lake Shore and Michigan Southern. The site of the city gradually rises from the harbor to a height of 50 to 60 feet, and presents a view most beautiful from a distance on the lake. It is protected by an immense breakwater nearly a mile long, and its harbors are among the best on the Niagara and Lake Erie.

Description. The area of the city is 42 square miles, and the streets are broad and generally cross each other at right angles. Most of the pavements are constructed of asphalt, this class of paving having a length of 235 miles, and the total number of miles paved aggregate about 400. Main Street, which extends northerly from the lake front, is the principal business thoroughfare. At the center of the business district, which is near Lafayette Square, Niagara Street starts from Main Street, and is the main highway to Tonawanda and Niagara Falls. Lafayette Square, where a number of streets meet, is surrounded by large and substantial business buildings and contains the beautiful Soldiers' and Sailors' Monument. Delaware Avenue and North Street are the principal avenues of the fashionable residential district, and here and in many other places are fine homes surrounded by lawns and ornamental shrubs and trees.

Buffalo has numerous parks and other points of interest for those who seek the open air. At the place where the waters of Lake Erie form the Niagara, south of Fort Porter, is the Front, a tract of 45 acres, and near the State Insane Hospital grounds is Delaware Park, whose area is 365 acres. Humboldt Park consists of 56 acres, and in the south are the three parks known as South Park, Stony Point, and Cazenovia Park. Forest Lawn Cemetery, a tract of 230 acres, is one of the numerous burial grounds of great beauty. Besides the Soldiers' and Sailors' Monument in Lafayette Square, are those of President Fillmore and Red Jacket in Forest Lawn Cemetery, and the fine monument dedicated in 1907 to President McKinley, who died in the city.

Buffalo is noted for its fine public school system, which includes kindergartens, grade and high schools, and a training school for teachers. It is the seat of a State normal school, the Martin Luther Seminary, the University of Buffalo, the Saint Joseph's College, the Academy of the Sacred Heart, and many other institutions, including numerous denominational and parochial schools. The charitable and philanthropic institutions include a State insane asylum, an orphan asylum, the Home for the Friendless, the Church Home for Aged Women, Saint Mary's Asylum for Widows and Foundlings, and Ingleside Home for Erring Women. It has more than 175 churches, and these represent all the leading denominations. The municipality has two libraries, aggregating about 235,000 volumes, and in addition are maintained a number of libraries in the schools and colleges. The educational associations are well represented, including the Society of Natural Sciences, Young Men's Christian Association, Lutheran Young Men's Association, and numerous scientific and historical societies.

The United States government building is a substantial structure of gray stone, erected at a cost of about $2,000,000. Other large buildings include the Chamber of Commerce, the city hall, the public library, the Fidelity Trust Company's building, the Ellicott Square building, the Grosvenor Library, and the Roman Catholic and Protestant Episcopal cathedrals. The Iroquois, Lafayette, Lenox, and Statler are among its larger hotels.

INDUSTRIES. Buffalo is preëminently a manufacturing and commercial city. This is due largely to the fact that its transportation facilities are very advantageous. A belt-line railroad encircles the city and furnishes facilities for intercommunication among the large number of trunk and branch lines, and enables transfers of freight with boats on the Erie Canal and steamships in its well-improved harbors. Though originally built for small towboats drawn by horses, the Erie Canal has been materially improved and will eventually furnish facilities for large vessels from the Atlantic by way of the Hudson River. The city has about fifty large grain elevators, including both transfer and floating elevators, and is the largest market for wheat and flour in the Eastern States. The elevator capacity is sufficient for 35,000,000 bushels, equipped to enable handling 5,000,000 bushels of grain per day. It is the largest coal market and lumber port in the world. The storage capacity for coal is enormous, and its coal docks are sufficient to enable handling 30,000 tons a day. In the manufacture of iron and iron products it ranks well with Pittsburg. Among the manufacturing establishments are machine shops, soap works, meat packing, rubber works, shipyards, flouring and grist mills, stove works, foundries, oil refineries, and brick yards. Enterprise in manufacturing is facilitated greatly by electric power obtained from a large plant at Niagara Falls, which is brought through three circuits having a normal capacity of 30,000 horse power. It has a large trade in live stock, manufactures of all kinds, and merchandise, and is a center for both retailing and wholesaling.

HISTORY. La Salle was the first European to visit the locality. He landed at its site in 1679, and near the present city built the *Griffin,* the first ship to sail on Lake Erie. The first settlement was made by a trader in 1792, and the Holland Land Company purchased a tract of land and platted it into townships the following year. The work of surveying and platting was done by Joseph Ellicot, and he is regarded the founder of Buffalo. The village founded at that time was situated at the mouth of Buffalo Creek and named New Amsterdam, but it soon came to be called Buffalo. A force of British and Indians under Gen. Riall captured it in 1813 and much of it was destroyed by fire, but it was rebuilt in 1815. Its prosperity began with the completion of the Erie Canal in 1825, when it became the center of a large trade in produce and raw materials. Black Rock was annexed in 1853. It was the home of Millard Fillmore and Grover Cleveland, and the latter was its mayor in 1882. The Pan-American Exposition was held in Buffalo in 1901, at which President McKinley was assassinated. Population, 1905, 376,618; in 1925, 538,016.

BUFFALO BILL. See **Cody, William F.**

BUFFALO GNAT (năt), a small insect found in the western section of the valley of the Missouri River and other regions. It attacks human beings and domestic animals, but differs from the mosquito in that it bites in the daytime. Swarms of these insects are most frequent when the sun shines brightly and there is no movement of wind. The bites are poisonous. The larva is aquatic and frequents well-aërated water.

BUFFALO GRASS, a short grass common to the fertile soil of the western plains of North America, ranging from Texas to Alberta and Saskatchewan. It seldom grows higher than six inches, but is very important as pasture for domestic and wild animals, especially in the arid regions, to which it is best adapted. In the summer it covers the ground with a dense growth and turns brown at the first frost, but is eaten at all times of the year. It propagates by runners as well as by its seed. The male and female flowers grow on different plants.

BUFF LEATHER, a kind of leather made originally from the skin of the buffalo, but now chiefly from light hides of cattle. It is naturally of a light-yellow color, but is sometimes bleached white or tanned and stained a dull yellow or dark brown. When dressed with oil, it becomes soft and does not easily crack or rot. It is used for making belts, gloves, pouches, and cartridge boxes.

BUFFON (bŭf'fōn), **George Louis Leclerc, Count de,** naturalist, born at Montbard, France, Sept. 7, 1707; died in Paris, April 16, 1788. He studied for the law, but traveled and later devoted himself to science. He was elected a member of the Academy of Science in 1739 and later made superintendent of the Royal Gardens of Paris. His best known works include "Natural History," "Epochs of Nature," "History of Birds," and "History of Minerals." The works of Buffon have exercised a wide influence in nature study. His scrutinizing researches laid a foundation on which Cuvier and others built their systems.

BUG, the name used frequently in describing the species of insects belonging to the order *Hemiptera.* The mouth is fitted for piercing and sucking, being in the form of a beak, and most of the species feed on the juices of plants. Some of these insects, such as the louse and bedbug, partake of animal fluid as well as that of plants. The cochineal and lac-dye insects, which belong to the bug family, secrete fluids valuable in commerce. The chinch bug, aphis, squash bug, and green bug are among the pests that destroy plants.

BUGGY, the name of a four-wheeled vehicle, either with or without a top or hood. The name is one of the *Americanisms,* and describes a vehicle called a *cart* in England, while cart in the United States is properly a vehicle with two wheels. Buggies are fitted for one horse, and are intended for light driving.

BUGLE (bū'g'l), a musical instrument made of brass or copper, used chiefly for signals. The bugle is the signal horn for the infantry, and has a shorter tube than the trumpet, which is used more generally for the cavalry. Bugle and trumpet calls remind the soldier in time of peace of daily routine duty, and in war they serve to direct and guide the marches and movements of troops.

BUILDING. See **Architecture.**

BUILDING AND LOAN ASSOCIATION, a society organized to promote interest in the accumulation of savings, and to provide facilities to secure the use of money at reasonable rates for those who desire to build homes. Associations of this kind are usually organized as private corporations, and are known by various names, such as coöperative banks, mutual loan associations, building societies, home aid associations, etc. They may be classed under two general terms, the *mutual* and the *proprietary.* Mutual societies receive deposits from individuals, who become stockholders to the extent of their deposits. Those who wish to invest in land or erect a building borrow the amount needed and give a mortgage on the property, and, when the amount of deposits equals the sum borrowed plus the interest, the stock is surrendered and thus cancels the debt. Proprietary societies pay interest on deposits and loan money for building purposes, secured by mortgage and repayable by monthly installments. When the total installments amount to the loan plus the interest, the indebtedness is canceled. In this class of associations, the profit to the company depends upon the difference in the rate charged those who borrow and that paid to depositors. Building associations were organized in Great Britain and Germany in the 18th century, and in America they date more largely from the last century. All of the states, provinces, and nations in which they are promoted have laws regulating the transaction of business, intended as a safeguard to the people who put their savings into such organizations.

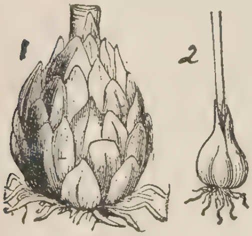
BUILDING STONE, any stone suitable for the construction of buildings or fitted for structural engineering. Many varieties of stone present a beautiful appearance in the quarry, but their composition is such that they disintegrate rapidly from the action of air and moisture. The disintegration may affect the appearance by reason of discolorations, or it may soften or dissolve the stone to the extent that the structure becomes unsafe. Stone of a porous nature, such as soft limestone, readily absorbs water, and it is greatly damaged by freezing and thawing. While material of this class may be suitable for the interior walls, it is not advisable to use it for exteriors. Some grades, especially those that contain iron, become discolored from the action of moisture.

The best building stones may be classed as fragmentary, calcareous, and crystalline siliceous rocks. Among the fragmentary rocks used in building are sandstone and slate. Sandstone is composed of grains of sand, either rounded or angular, and held together by a cementing material, such as silica or carbonate of lime. The color depends upon the nature of the cementing material. In gray sandstone the cementing material is carbonate of lime, in white colored stone it is silica, and in brownish or reddish stone it is mixed with oxide of iron. Slate is used largely in roofing and for floors. The calcareous rocks include the limestones and marbles, and in color vary as much as sandstones and for the same reason. Granite is the most familiar example of crystalline siliceous rock, and is one of the most durable and valuable building materials. It is quarried extensively in Canada, especially near Kingston, Ontario; near Victoria, British Columbia; near Saint George, New Brunswick; and near Shelburne, Nova Scotia. Quarries are worked in the United States at Berry, Vt.; Saint Cloud, Minn.; Concord, N. H.; Westerly, R. I.; Richmond, Va.; and many other localities. Granite ranges from dark red to light gray, and includes many shades of colors.

BUKOWINA (bōō-kō-wē′nä), a territory of Roumania, located east of Hungary and south of Galicia, in the basins of the Purth and the Dniester rivers. The area is 4,035 square miles. Czernowitz is the capital. Population, 1922, 830,681.

BULACAN (bōō-lá-kän′), a town of the Philippine Islands, on the Island of Luzón, twenty miles northeast of Manila. It was important as a military point and the scene of several insurrections during both the Spanish and American occupation of the islands. Population, 13,800.

BULB, in botany, a broad imbricated bud, either above or beneath the surface of the ground, having roots beneath and the stalk and foliage above. The leaves or scales with which it is clothed are thickened by the deposition of nutritive matter, stored for the future use of the plant. It differs from the tuber, which is the enlargement of a subterranean branch and forms the fruit or seed. Some plants have bulblets, or small aërial bulbs, as in some kinds of onions. Among the chief bulbous plants are the tulip, onion, and common lily.



BULBS.
1, Meadow Lily; 2, Tulip.

BULGARIA (bŏŏl-gā′rĭ-á), a principality of Europe, in the eastern part of the Balkan Peninsula. It is situated between north latitude 41° 30′ and 44° 15′ and east longitude 22° 30′ and 28° 30′. It is bounded on the east by the Black Sea, south by Turkey, west by Servia, and north by Rumania. Most of its northern boundary is formed by the Danube River. The area of Bulgaria proper is 24,280 square miles, and of Eastern Rumelia 13,800, or a total of 38,080 square miles.

Description. Bulgaria is a mountainous country, traversed by the Balkan Mountains. In the southwest corner of Rumelia are ranges of the Rhodope Mountains, between which are deep valleys isolated from each other except by elevated passes. The Balkans include Vitosha, 7,517 feet, and Musalla, 9,610 feet, which are the highest summits. The ranges of the southern section are less elevated.

Most of the drainage is into the Black Sea, chiefly by the Danube and its tributaries. The confluents of the Danube include the Lom, Vid, Osma, and Ogost. Those flowing into the Black Sea direct include the Devna and Kamtchik. The Maritza and Struma flow southward into the Aegean Sea. Its eastern boundary is indented by the Gulf of Burghas, an inlet from the Black Sea.

The climate is healthful and quite pleasant, though a district subject to malaria extends along the Black Sea. It may be said that Bulgaria has a somewhat colder climate than Eastern Rumelia, since the elevated Balkan Mountains obstruct the passage of breezes from the Mediterranean. In Bulgaria the climate ranges from eight degrees below zero to ninety above, with an average temperature of about 50°. Forests cover the mountains, but the valleys are mostly treeless. Among the wild animals are the deer, bear, boar, and many species of wild fowl.

Industries. Agriculture is the chief enterprise, and the land is subdivided in small holdings among the peasants, who pay a nominal rent to the government, to which most of the land belongs. About twenty-five per cent. of the land is under cultivation and fifty per cent. is in pasture. Corn and wheat are the chief products, and next of importance are barley, rye, oats, and vegetables. Grapes are grown extensively. The government has control of all the minerals and operates the mines. Coal is the chief mineral product, but other minerals of value abound, including lead, copper, zinc, cobalt, and petroleum.

The Danube is important as an avenue of transportation. A number of its tributaries have been improved and canals have been constructed, which, together with the Black Sea, afford considerable shipping facilities. The railroad lines aggregate about 1,200 miles, most of which are owned and operated by the government, and telegraph and telephone lines connect the business centers with the cities north and south. Bulgaria has nine river ports and seven seaports, which are the seat of most of the trade. The exports are somewhat larger than the imports, and foreign trade is chiefly with Austria-Hungary, Germany, Great Britain, France, and Turkey.

Government. Bulgaria is a constitutional monarchy. Chief executive power is vested in the sovereign, and legislative authority is vested in him and the national assembly, or sobranje, which consists of deputies elected by universal manhood suffrage. The sovereign is assisted by a ministry responsible both to him and the assembly. For the purpose of local government it is divided into twenty-two okrugs and these are subdivided into eighty-five okolics. An obligatory school attendance law is enforced quite generally, and the school system includes both grade and high schools. Special and technical schools, gymnasia, and the University at Sofia comprise the facilities for higher educational work. The Greek Catholic Church is recognized by the state, though a considerable number of the inhabitants are Mohammedans and Jews.

Inhabitants. The people of Bulgaria belong to the southern branch of the Slavic stock, and are made up of several more or less closely related branches, of which the Teuto-Slavic, Teutonic, and Finno-Tartaric are the most numerous. Some Greeks and Mussulmans are included, though the percentage is not large. The language is of Slavic origin and consists of the old and new dialects, the former being the richer and more generally spoken. Sofia is the capital of Bulgaria proper and of the principality, while Philippopolis is the capital of Eastern Rumelia. The former is the largest city and chief commercial and intellectual center. Other cities of note include Varna, Burghas, Shumla, and Rustchuk. In 1926 the population of the country was 5,483,125. This number included 497,818 Turks, 83,942 Rumanians, 69,757 Greeks, 94,649 Gypsies, and 36,455 Jews.

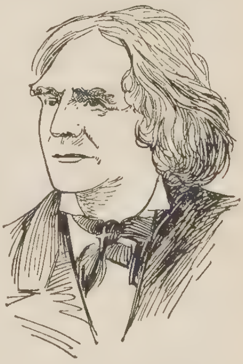
History. The history of Bulgaria is intimately connected with the early history of Eastern Europe. Most of the early occupants came from the banks of the Volga and overran the country in the 6th century. They built up a strong central government and for some time ruled Epirus, Thessaly, Albania, and Macedonia, and looked forward to the founding of a great Slavonic empire. However, they were conquered soon after the rise of the Byzantine Empire, and later fell under the dominion of the Turks, which caused them to lose much of their civilization, and their national spirit was broken. A new spirit of nationality rose about the middle of the 18th century, when they established newspapers, developed literature, and founded schools and colleges, but the Turks, jealous of their development, continued to hold them under subjection. The wholesale slaughter of Christians in 1876 by the Turks aroused the spirit of Christian Europe. Russia soon after occupied the region with an army to defend them against the onslaughts of the Turks, which resulted in the War of 1878 and the final treaty of peace at Berlin.

Bulgaria was now made an independent state, with the condition that the choice of its chief ruler must be concurred in by the powers of Europe and Turkey. Prince Alexander of Battenburg was elected sovereign in 1881 and was authorized to convoke a constitutional convention to be promulgated in 1888. Two years previous to this he was kidnapped and compelled to abdicate on account of Russian hostility to him and to his followers. However, he was in touch with the spirit of the Bulgarians and only abdicated to avoid complications with Russia. In 1887 the vacant throne was filled by the election of Prince Ferdinand of Saxe-Coburg, youngest son of Prince Augustus of Saxe-Coburg. Eastern Rumelia was united to Bulgaria proper in 1885, which resulted in a war with Servia, but the latter power was defeated. In 1908 the sobranje, under the guidance of Prince Ferdinand, declared the country independent of Turkey and the latter assumed the title of Czar of Bulgaria. In 1915 the country entered the great European War on the side of Germany and fought vigorously until 1918, when her armies surrendered and the Czar abdicated.

BULL or **Papal Bull**, an edict or decree of the pope, equal to the proclamations of secular sovereigns. The bulls are written in Latin for most countries, and are transmitted to the churches that recognize the pope as their head. The first words of the text usually designate the character of the contents. They are written on parchment, and those issued as a favor have a leaden seal appended by means of a silken cord, but those issued as a matter of justice have the seal attached with a cord of hemp. Edicts issued by secular sovereigns were formerly called bulls. The most important of these was the *Golden Bull* of Charles IV., Emperor of Germany, issued in 1356, which fixed the laws to regulate the number and privileges of electors and the election of emperors.

BULL, John, a name used as a popular synonym for the English people. It originated in 1712, when Arbuthnot published his satire, "The History of John Bull," to intensify the feeling against the war with France and to ridicule the Duke of Marlborough.

BULL, Ole Bornemann, famous violin virtuoso, born in Bergen, Norway, Feb. 5, 1810; died Aug. 17, 1880. He began to show musical talent by his performance on the violin at the age of five years, played that instrument at the theater where his father was actor when nine years old, and was sent to Paris to study music. Later he studied at Milan, Italy, and achieved success by traveling through Switzerland, Germany, and Italy. He visited London and traveled through the United States, Canada, and the West Indies, returning in 1848. He made a


OLE BULL.

second visit to America in 1852, and remained five years, endeavoring to found a Norwegian colony in Potter County, Pennsylvania, though his enterprise was not successful. His success in appearing before American audiences was remarkable. He was visited by great crowds night after night and made a fortune, which was partly lost in his colony, called Oleana, in Pennsylvania. He visited America again in 1869 and was again shown great appreciation by the attendance of immense crowds. Critics estimated him a man of remarkable character and an artist of wonderful genius. He manifested a great love for his native land, Norway, and was filled with sensitive imagination by its story and songs. This was reflected in his style of playing and rendered a poetic charm and originality which always enthused his audience. The people of Norway regarded his death a national loss. His biography was written by Sarah C. Bull, his second wife, entitled "Ole Bull: A Memoir."

BULLDOG, a kind of dog that has been bred as a distinct race for centuries. It is characterized by its thick, short, flat muzzle, a projecting under jaw, thick lips, half-pricked ears, flat forehead, and low but thick and strong body. It is a good watchdog on account of its activity, courage, and intelligence. The *bull terrier* is smaller than the bulldog, and is a cross between the bulldog and the terrier. Formerly the sport of bull-baiting was practiced in England. It consisted of blowing the nose of a bull full of pepper and setting bulldogs upon him, one at a time. The sport consisted chiefly in seeing the dogs tossed.

BULLDOZE (bu̦l'dōz), a word derived from the practice of punishing those who, in 1876, were stealing and killing cattle in Louisiana. The punishment was with a bull whip and a dozen lashes were called a dose, hence the word bulldoze. In the same year it was applied in the political campaign, when some of the Negroes were prevented from exercising the elective franchise by *bulldozing.* The term now signifies to overawe, to silence by threat, to terrify.

BULLER, Redvers Henry, military officer, born in Devonshire, England, Dec. 7, 1839. He entered the army at the age of eighteen years, fought against the Ashantees, Zulus, and Kaffirs, and later served in the Boer War of 1881. The following year he engaged in the Egyptian campaign, in 1884-85 took part in reducing the natives of the Sudan, and became adjutant-general in 1890. In 1899 he was made supreme commander of the British forces in South Africa, but was superseded by General Roberts after suffering serious reverses in the vicinity of Ladysmith, which place was besieged by the Boers. He was very popular among his men and was held in high esteem personally, but his ability as a military officer was questioned on account of advising General White to surrender Ladysmith to the Boers. He died June 2, 1908.

BULLET (bu̦l'lĕt), a projectile discharged from a rifle and other small arms. Bullets are made chiefly of lead, and those intended for smooth bore arms are usually spherical, and those for rifled arms are elongated with the apex rounded or conical. Formerly bullets were cast, but now they are made largely by being stamped in steel dies. Copper-covered bullets poison a wound and are not favored in modern warfare.

BULLFIGHT (bu̦l'fīt), the national game of the Spanish and Mexicans. It was introduced into Spain by the Moors, and has continued popular ever since. The bullfighting season begins in April and ends in November. Bullfights take place in a kind of arena or circus. In most cases the fighters mount a horse, and, armed with a sword or lance, they worry the bull until he is killed. Often a horse is killed by the infuriated animal, when the fighter mounts another or combats with the animal on foot. In the larger cities where bullfighting is practiced regularly each season, there are three classes of fighters. They consist of the *picadores,* who are on horseback; the *banderilleros,* who are on foot; and the *matadors,* or the killers. When a bull has been killed, he is dragged away and another is brought from the stall into the arena. Nearly all Spanish cities have places to carry on these games, which are attended by thousands of people. In early history the game was popular in Greece, Rome, and other countries, but it was forbidden by the popes and later emperors, and was abolished by Charles IV., but was reinstated by Joseph Bonaparte, brother of Napoleon. At the great games of Madrid, in June, 1833, over a hundred bulls were killed in a single week. It is still popular in Mexico and Spanish America.

BULLFINCH (bu̦l'fĭnch), a bird of the finch family. The male has a black tail, throat, bill, and head; the back is bluish-gray and the breast is red. It is nearly seven inches long. The female is less brightly colored. These birds feed on moss and buds of fruit. They are prized for their song and can be taught to sing musical airs. The bullfinch is found in Europe and on the islands adjacent to its coasts. Allied species inhabit Asia and one is found in Alaska.

BULLFROG (-frŏg), a large aquatic frog widely distributed in Canada and the United States, but most abundant in the warmer regions. The larger species are common to the Southern States, and are found more commonly in marshes and swampy lands. The voice is a deep bass, loud and coarse, from which the name was derived. They feed on worms, insects, and crustaceans, and the larger species eat other frogs and young birds. The hind legs are edible and considered a delicacy.

BULLION (bul'yŭn), the term used to describe uncoined gold or silver which has been reduced to the standard fineness of the coinage of a country. It is sometimes employed to designate these metals whether they are coined or uncoined, and is likewise applied to old or foreign coin held for recoinage. In England it is quite common to report as bullion the metallic reserve held in banks, but such money is more generally referred to as coin in the United States.

BULL RUN, a small stream in northern Virginia, a tributary of the Potomac through the Occoquan River, which was the scene of two great battles of the Civil War. The first was the great battle that took place on July 21, 1861, between McDowell, commanding 28,000 Union soldiers, and Beauregard and Johnson, leading 31,000 Confederates. The battle commenced early in the morning, the advantage remaining with the Federal forces until noon. They had crossed Bull Run and attempted to displace the enemy's left, but the Confederates received reinforcements in the afternoon and led a vigorous attack upon the Union forces, causing them to retreat in confusion and disorder, the panic reaching as far as Washington. The Confederates lost 2,000 men and the Union loss was about 2,800. Jackson rendered valuable services to the Confederate side and was named "Stonewall" ever after. The battle had an encouraging effect upon the South, and clearly demonstrated that the war would be a long struggle instead of a skirmish of several months, as formerly supposed by the people of the North.

The second battle of Bull Run occurred Aug. 29 and 30, 1862. The Confederate forces were commanded by Jackson, who was awaiting reinforcements at Bristoe Station, and the Union army, consisting of 40,000 men, was commanded by General Pope. McDowell was dispatched to intercept Lee's conjunction with Jackson, but was recalled to join Pope. Jackson then moved to Manassas Junction and took a strong position near Gainesville behind an old railroad grading. The Union attack was led by General Sigel at daylight on August 29. The battle raged furiously in the forenoon, Pope expecting McDowell and Porter to join with reinforcements. However, the afternoon arrived, but Porter never came. The fighting ceased at night and was resumed the next day, but Pope's troops were so wearied that he was compelled to retire. Porter was afterward court-martialed for his conduct during the battle and dismissed from service. The losses, though never accurately determined, were heavy, about 9,500 for the Confederates and 14,500 on the side of the Federals. Lee took the aggressive immediately after the battle and invaded Maryland.

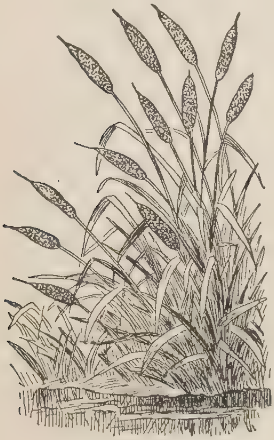
BULL TROUT, the name applied to certain species of fish belonging to the salmon family. They are fine game fish and are frequently mistaken for the salmon, from which they differ in having a body somewhat thicker than that of the salmon. The bull trout of England is found in large numbers in the mouths of rivers and approaches the salmon in size and habits. In some sections of the Rocky Mountains, where a fine species is abundant, it is considered a fine game fish, but is more popularly called the *Dolly Varden trout.*

BÜLOW (bü'lō), **Bernhard, Count von,** statesman, born in Klein-Flottbeck, Germany, May 3, 1849. After studying in his native town and in Lausanne, he took courses in the universities of Leipsig and Berlin, and served efficiently in the war of 1870-71 against France. Subsequent to the war he entered the consular service and was secretary of legation at Rome, Saint Petersburg, and Vienna, and in 1878 represented the government at Athens, Greece. The Berlin congress of 1878 elected him secretary and subsequently he represented the nation as ambassador to Italy. In 1899 he concluded a treaty with Spain by which the Pelew, Caroline, and Ladrone Islands became German territory. He was made chancellor of the empire in 1900. The imperial expansion policy of Germany was supported by him, and through his influence the position of Germany was strengthened in the Great European War which began in 1914.

BÜLOW, Friedrich, military leader, born at Falkenberg, Germany, Feb. 16, 1755; died Feb. 25, 1816. He entered the Prussian army at the age of fourteen years, was lieutenant at the opening of the war in 1813, and in that year commanded in battles at Möckern and Halle. He succeeded in driving the French out of Westphalia and Holland, and joined the allies in Paris, where he received the title of Count of Dennewitz, in recognition of his success against Ney at Dennewitz. In 1815 he fought with Blücher at the Battle of Waterloo, and was an important factor in defeating Napoleon. Subsequently he occupied a strategic point at Paris. He was made a Knight of the Black Eagle and a monument was erected to his honor in Berlin.

BÜLOW, Hans Guido von, distinguished pianist, born at Dresden, Germany, Jan. 8, 1830; died Feb. 12, 1894. He studied law at the University of Leipsig, but showed early aptitude in music, which is regarded more as a diversion than a subject for study. The successes of Liszt and Wagner at Weimar and elsewhere influenced him to intrust himself to the personal instruction of Wagner in 1850. His first musical tour was made three years later. In 1854 he became pianist at the imperial court at Berlin, and ten years later was made pianist at the Bavarian court. In 1869 he retired for some time to Florence, but soon entered upon great concert tours through Europe and America, and gained a world-wide reputation. On returning to Germany he entered the court of Meiningen as musical director, and became renowned as a director in the Liszt-Wagner school. Among his thirty musical works the following may be mentioned as of high repute: "Nirvana," "Der Sänger's Fluch," and "Overtures to Julius Caesar."

BULRUSH (bul'rŭsh), the popular name of an aquatic plant. It is rushlike or reedlike, with a cylindrical stem growing from two to ten feet in height. In many species the sheath bears a small awl-shaped leaf, and the culm is tipped with an erect and pointed leaf. The roots are creeping and have astringent and diuretic properties useful in medicine. In some species the flowers are compound, with small spikes on their sides. The stems and leaves are the most useful parts of the plant, since their toughness renders them of service in thatching and for making chair bottoms and mats. The bulrushes are common to the rivers and ponds of many sections of America and Eurasia. Large tracts of Southern Asia are noted for a prolific growth of these plants, where they are used quite extensively by the natives for thatching cottages.



BULRUSH.

BULWER-LYTTON (bul'wẽr-lĭt'tŭn). See **Lytton.**

BUMBLEBEE (bŭm'b'l-bē), or **Humblebee,** a large bee found in nearly all parts of the world, except New Zealand and Australia. It has a hairy body and the tibiae of the hind legs terminate in two spines. The community ranges from fifty to two hundred. A large number of species have been described, most of which select as a nest some hole in the sod, frequently a deserted mouse nest, or an opening between rocks or in a log. About half of a colony are workers and the remainder are males and females. Rude cells are built by the workers, in which the honey is deposited and at the end of the season all except a few females die. In the spring the fertilized female gathers a mass of pollen and honey and deposits her eggs, and the scant store of honey is laid up by the workers as they mature, while the mother bee confines herself to the task of increasing the numbers of the colony. The females are longer than the males and workers, and they live together in the same colony without attacking each other. These bees are not valuable except that they fertilize plants, and some species of clover depend for their fertilization exclusively upon these insects. This fact has caused the bumblebee to be introduced in Australia.

BUNCE, Francis Marvin, naval officer, born at Hartford, Conn., Dec. 25, 1836; died Oct. 19, 1901. He attended public schools in his native town and the United States Naval Academy, graduating from the latter in 1857. He was executive officer of the *Penobscot* at the beginning of the Civil War, had charge of the naval howitzers in the combined army and naval expedition July 10, 1863, by which a part of Morris Island was captured, and in the same year took part in the attacks on Charleston and Fort Sumter. For efficient services he was made lieutenant commander, had charge of the Boston navy yard until 1869, and filled other positions until 1898, when he retired with the rank of rear admiral. During the Spanish-American War he was in command of the Brooklyn navy yard.

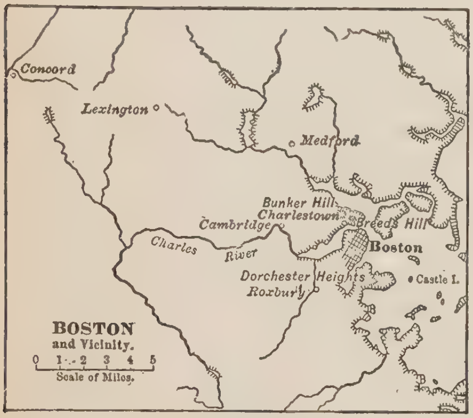
BUNCOMBE (bŭn'kŭm), **Edward,** soldier, born at Saint Kitts, West Indies; died in Philadelphia, Penn., in 1777. He was educated in England and settled in North Carolina, where a county was named for him in 1791. He fought in the Revolutionary War and became a member of Congress. At one time he was engaged in speech making, and when an effort was made to cut him short he declared that he was "talking only for Buncombe." From this the well-known phrase originated, and is used to express talking only for effect, or, in the case of an officer, to please his constituents.

BUNDESRAT (bo͝on'dĕs-rät), the federal council of the German empire which represents the individual states, the nation being represented by the Reichstag. It is mainly a confirming body, but has power to reject measures passed by the Reichstag. The imperial chancellor is presiding officer and the members from each state vote as a unit.

BUNGALOW (bŭn-gȧ-lō'), the name of a kind of house built in the interior of India. It is of light construction, one-storied, and usually of sun-baked brick. The roof is thatched or tiled, and extends some distance over the walls so as to prevent them from becoming excessively wet during a rain. Bungalows are constructed for officer's quarters and by many Europeans, who furnish them elegantly. In some parts of India, where the country is not well settled, structures of this kind are erected and maintained by the government for the benefit of travelers, who are charged a small fee per day when they occupy them.

BUNION (bŭn'yŭn), an inflammation and enlargement of the membraneous sack situated over the metatarsal joint of the great toe. It is caused by pressure, hence may be attributed to a tight or badly fitting boot or shoe. The attack begins with a small spot and gradually enlarges, and may be overcome by rest and poulticing. It is advisable to wear a shoe that will protect the bunion against pressure.

BUNKER HILL, a small elevation in Charlestown, now connected with Boston, Mass., the site of the famous Battle of Bunker Hill. The battle occurred on June 17, 1775, between the British, commanded by Generals Clinton, Howe, Burgoyne, and Gage; and the American army, by Generals Ward and Putnam, Colonel Prescott, and Major Brooks. The British army occupied Boston with 10,000 men and intended to occupy Bunker Hill and fortify themselves on the neighboring heights. The American army consisted of 15,000 men stationed at Cambridge.



MAP SHOWING BUNKER HILL AND THE VICINITY OF BOSTON.

Hearing of the intention of the British, the Americans hastened to fortify Breed's Hill, near Bunker Hill, and were attacked by the enemy from their ships and batteries in Charlestown harbor. They advanced upon the Americans from Morton's Point, who withheld their fire until the British were close upon them, when they made a vigorous defense and repulsed the British with great loss. A second unsuccessful attack was made, and soon after followed the burning of Charlestown. The British led a third attack and were resisted by the Americans with stones and the butts of their rifles, on account of their ammunition being exhausted, but the latter finally withdrew from the scene of battle with small loss. The Americans lost 308 wounded, 30 prisoners, and 116 killed, among them General Warren. The British loss was 1,054. The Battle of Bunker Hill, although unfavorable to the Americans, was really a victory in that it taught the lesson that the patriots were fired with a great cause and that the British could be defeated. They were greatly encouraged in spirit and a general respect for their soldierly ability was inspired.

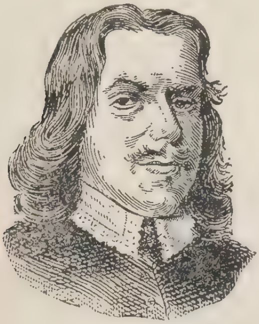
The Bunker Hill monument is located in the center of Breed's Hill. The corner stone was laid June 17, 1825, by General Lafayette in the presence of an enormous and enthusiastic crowd, among them many survivors of the battle fought fifty years before, who had gathered from far and near. After singing "Old Hundred," Daniel Webster delivered his famous address. The monument was completed June 17, 1843, when Webster delivered another address before a large audience, among them President Tyler and a number of his cabinet members. This monument is of beautiful granite, 221 feet in height. The chamber at the top is reached by a spiral stairway.

BUNKER HILL MONUMENT. See **Boston; Bunker Hill.**

BUNSEN (bo͝on′sen), **Robert Wilhelm,** famous chemist, born at Göttingen, Germany, March 31, 1811; died at Heidelberg, Aug. 16, 1899. He studied at the Göttingen University and at Berlin, Paris, and Vienna. In 1836 he became professor at the Polytechnic Institute at Cassel; in 1838, at the University of Marburg; in 1851, at Breslau, and in 1852, at Heidelberg. He is the inventor of the Bunsen burner and of the electric pile, and discovered the principles for producing large quantities of magnesia and magnesium light. Bunsen also discovered spectrum analysis. He wrote extensively on physics, geology, and chemistry. His discovery of spectrum analysis opened a field so new and vast that it may be regarded the most important scientific result of the last half century; upon it depends the separation and measurement of gases. The Bunsen burner consists of a tube used in burning gas, which is mixed with air before ignition, thus producing a smokeless flame of great heat. He published "The Reaction of Flames" and "Chemical Analysis by Means of Spectral Observations."

BUNTING (bŭn′tĭng), the name of several birds native to Asia and Europe. It resembles the finches, but differs from them mainly in having a bony knob on the palate, which is an enlargement of the dentary edges of the bill. The *snow bunting* is common to the colder regions, and the *common* or *corn bunting* is seen in England and continental Europe in the fields, where it gathers food. About twelve species have been described, and to these may be added a large number of birds very closely allied in habits and structure. They gather in flocks on the approach of winter and move toward the warmer regions, and in the spring go far north to breed. The *cowbird,* or *cow blackbird,* is a familiar bird of North America of this class. See **Cowbird.**

BUNYAN (bŭn′yan), **John,** religious writer and minister, born at Elstow, near Bedford, England, in 1628; died at London, Aug. 31, 1688. He was the son of a tinker and practiced that humble craft until about seventeen years old, when he entered the army and was present at the siege of Leicester. His education was self-made; his library consisted of a Bible and a copy of Fox's "Martyrs." At the close of the Civil War he became interested in religious subjects and began to preach to the poor people in Bedford and the adjacent villages. He joined the Baptist congregation at Bedford and was chosen the pastor soon after, where he ministered with great diligence and success for five years, attracting large congregations by his natural skill and earnestness. The act against conventicles checked his labors and he was convicted and sentenced to perpetual banishment. Acting in defiance of the law, he was imprisoned for twelve years. While in prison he supported his wife and children by making laces, and at the same time writing for the benefit of posterity. Release was offered him on the condition that he would quit the ministry, which he refused, and he was finally granted freedom by the act of James II., declaring liberty of conscience. He again engaged as a preacher at Bedford and at the same time ministered to a congregation at Millane. His principal writings include "The Holy War," "Grace Abounding to the Chief of Sinners," and "The Pilgrim's Progress." The last mentioned is the most popular of his books, and has been translated into more languages than any publication except the Bible. It is a beautiful allegory, giving a vivid account of Christian as he passed through the Valley of Humiliation. A beautiful statue was erected to the memory of Bunyan at Bedford in 1874.


JOHN BUNYAN.

BUOYS (bwoi), the floating bodies that are fastened or anchored at a point near the location of reefs, shoals, or other dangerous objects in or near harbors as a safeguard in guiding ships. They are usually painted in bright colors, as red and white, so they may be easily seen. A class known as *whistling buoys* have an apparatus which is acted upon by the movement of the waves, causing compressed air to escape through a whistle. In recent years electric incandescent lights were introduced. Buoys of this class are connected by wires with the shore, and are securely anchored by means of wire-rope moorings. Formerly large steamers could sail into harbor only in daytime, but with the use of electric buoys they pass safely at night. The lights used are of 100-candle power, and are fastened to cedar buoys anchored with 5,000-pound weights. Charts are made of the harbor, on which are shown the location and the special information to be conveyed by the buoys. These charts are placed in the hands of navigators for their instruction when entering or leaving the harbor. The Germans have invented and extensively use an electric life buoy. It is supplied with a storage battery that casts a light over a mile for six hours. It has proved of much value in the life-saving service.

BURBAGE (bûr'bĭj), **Richard,** actor, an associate of Shakespeare, born about 1567; died March 13, 1619. He appears to have been a member of a company of actors who visited continental Europe, and seems to have exercised an influence upon the development of the theater in Denmark and Germany. With Shakespeare and Hemming, he took an interest in building the Globe Theater, and played in some of the leading rôles in "Richard III.," "Hamlet," "Othello," and "King Lear."

BURBANK (bûr'bănk), **Luther,** naturalist, born at Lancaster, Mass., March 7, 1849. He spent his boyhood on a farm, where he devoted much time to the study of plant life. In 1875 he removed to Santa Rosa, Cal., where he established experimental farms for the purpose of originating new varieties of plants and improving many of the fruits and vegetables. He originated the Burbank potato; the Sugar, Stoneless, and Giant prunes; the Giant, Fragrance, and Shasta Daisy callas; the Burbank and Santa Rosa roses; and the America, October Purple, and Climax plums. Besides originating these and other new varieties, he improved many grasses, nuts, grains, flowers, and vegetables. He evolved a smooth and fruit-bearing cactus from the wild, thorn-covered variety. He improved the tobacco plant so it grows taller and yields larger leaves, and was especially successful in variegating the color, size, and durability of flowers. In carrying on this work he experimented extensively in cross fertilization. The forms originated and the plants materially improved by him are those selected from a vast number that have been studied and cross fertilized successfully. He died April 11, 1926.

BURBOT (bûr'bŏt), a fresh-water fish of the cod family, the only representative of that class of fishes which does not enter salt waters. In appearance it resembles the ling, having an elongated form and a broad head. The skin is covered with imbedded scales and the mouth is large. It has two small barbels on the nose and a larger one on the chin. It inhabits the streams and lakes of North America, from Canada to Mexico, and is sometimes called *eelpout, coney fish,* and *fresh-water cod.* Several species closely related are well known in the United States, where they grow to a weight of twelve pounds, but the species of Europe are somewhat smaller.

BURDEKIN (bûr'dē-kĭn), a river of Australia, in the northeastern part of Queensland. It rises in the Gilbert Range of the Australian Alps and flows southeast until it is joined by the Belyando River, when it turns abruptly and flows almost due north into Upstart Bay, an inlet from the Pacific Ocean. It is about 350 miles long.

BURDETT-COUTTS (bûr-dĕt-ko͞ots'), **Angela Georgiana, Baroness,** British philanthropist, born April 21, 1814; died Dec. 30, 1906. She inherited immense wealth from her grandfather, Thomas Coutts, and became deservedly popular for her great liberality and assistance rendered to churches, schools, and charities. She founded fifty scholarships, including the Burdett-Coutts scholarship at Oxford. The government granted her a peerage in 1871. The freedom of the city of London was conferred upon her in 1872, and the freedom of Edinburgh, in 1874. In 1881 she married William Lehman Ashmead-Bartlett, born in New Brunswick, N. J., in 1851, who assumed her name. He was elected to Parliament in 1885 as a Conservative member for Westminster.

BURDETTE (bûr-dĕt′), **Robert Jones**, lecturer and humorist, born in Greensboro, Penn., July 30, 1844. He was educated in the public schools of Peoria, Ill., enlisted as a private in 1862, and served to the close of the war. In 1869 he became connected with the *Peoria Transcript*, afterward with the *Review*, and later accepted the position of associate editor of the *Burlington Hawkeye*, at Burlington, Iowa. His humorous sketches made him a reputation. He entered the lecture field in 1877, and was licensed as a preacher by the Baptist denomination. Among his publications are "Life of William Penn," "Innach Garden," "Chimes from a Jester's Bells," and the famous production "The Rise and Fall of the Mustache." He died Nov. 19, 1914.

BURDOCK (bûr′dŏk), a coarse-looking weed with hooked flower heads that adhere to the wool of sheep, the hair of other animals, and to clothing. By these means the ripened seeds are widely distributed. It is regarded troublesome in Canada and the United States, but in some countries is cultivated for food. The roots and young shoots are the edible parts. It yields medicine useful for rheumatism and cutaneous diseases.

BUREAU (bū′rō̂), in government, a department of public business requiring a force of clerks, who labor under the direction of a chief. The term is confined to inferior and subordinate departments of England and the United States, such as the pension bureau, but most governments on the continent of Europe apply the term to the higher departments, as the bureau of the minister of foreign affairs. In Russia the administration is carried on through a series of officials, each of which is at the head of a bureau, and from this has arisen the term *bureaucracy*.

BUREAU OF THE AMERICAN REPUBLICS, a bureau maintained in the United States with the view of collecting and distributing commercial information concerning the republics of America. It was established under the recommendation of the Pan-American Conference held at Washington in 1889, of which James G. Blaine, then Secretary of State, was the president. It is controlled by the Department of State and the chairmanship of the executive committee is vested in the Secretary of State. The general director of the Bureau of the American Republics has charge of its business and must be a citizen of the United States, but the executive committee is made up of one representative for each country that has membership in the union. The bureau is supported by the several American republics in proportion to their population.

The bureau continues to publish monthly bulletins of general information relative to commerce, resources, and political matters of general interest. A series of useful handbooks are issued as well as directories and bulletins treating of the patent, copyright, land, mining, and tariff interests of the countries concerned. In 1905 the members from the United States took position with those who favored a reduction of tariffs on some articles and reciprocity in trade, which, if successfully carried out, would no doubt increase the trade among the American republics.

BURGESS (bûr′jĕs), **Frank Gelett**, author, born in Boston, Mass., Jan. 30, 1866. He attended the Massachusetts Institute of Technology, where he graduated in 1887, and for three years worked as draughtsman on the Southern Pacific Railway. In 1891 he became instructor of drawing in the University of California, and subsequently established several periodicals. He removed to New York in 1897 and the following year went to London, but returned to San Francisco in 1900. Many of his drawings are fantastic and his writings are delightfully whimsical. His works include "The Nonsense Almanack," "The Reign of Queen Isyl," "The Purple Cow," "A Gage of Youth," "Goops and How to be Them," and "Burgess Nonsense Book."

BURGESS, T. J. W., physician and educator, born in Toronto, Can., March 11, 1849. He studied at the Upper Canada College and Toronto University, and in 1870 became surgeon of the North American Boundary Commission, in which position he rendered efficient services and was thanked by the imperial government. In 1875 he became assistant physician of the London Asylum for the Insane and in the meantime filled other responsible positions. He was made professor of mental diseases at McGill University, Toronto, in 1893, and was chosen president of the American Medico-Psychological Association in 1904. His publications are very numerous and include many works on botany and historical and psychological subjects. Among his books are "How to Study Botany," "A Historical Sketch of Canadian Institutions for the Insane," "A Botanical Holiday in Nova Scotia," "The Beneficent and Toxic Effects of the Various Species of Rhus," "Art in the Sick Room," and "The Insane in Canada."

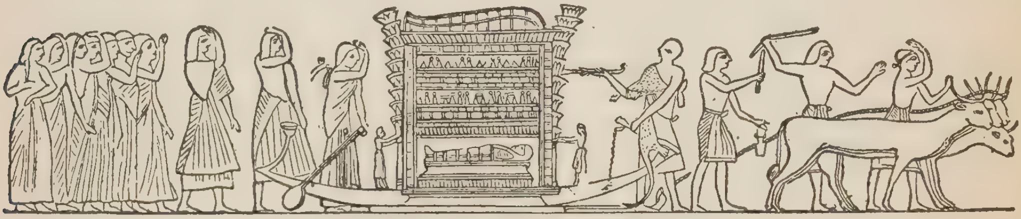
BURGOS (bo͝or′gō̂s), a city of Spain, capital of a province of the same name, 130 miles north of Madrid. It is on the Arlanzón River, near the Sierra de Oca, and has railroad and electric railway facilities. The surrounding country produces cereals and fruit, and it is important as a market for wool, merchandise, and machinery. Hat making and weaving are among the chief industries. It has a Gothic cathedral founded in 1221, and contains the tombs of Cid and Don Fernando, who resided at Burgos. It was the capital of the kingdom of Castile until 1087, when Alfonso VI. removed the seat of government to Toledo. Population, 1905, 31,425; in 1920, 31,489.

BURGOYNE (bûr-goin′), **John,** one of the chief commanders of the British in the American Revolution, born in 1722; died in London, Aug. 4, 1792. He entered the army in 1759 as a subordinate, serving first at Belle Isle, and later took part in the war against Portugal and Spain. He became a member of Parliament in 1761. In 1776 he came to America and took a prominent part in the Revolution. He served as a commander in the Battle of Bunker Hill, and wrote a description of it for the benefit of his friends in England. In 1777 he took charge of a large force to penetrate from Canada into the districts south, then in a state of revolution. He captured Ticonderoga, but was surrounded by the Americans under Gen. Gates at Saratoga and was compelled to surrender. Soon after he returned to England, where he was denied an audience by the king and became unpopular because of his ill success at Saratoga. A change of administration occurring, he was appointed commander in Ireland, but he resigned the position after two years and engaged in literature. He wrote an account of his campaigns in America, as a matter of defense, and published "The Maid of the Oaks" and "The Heiress." The latter is still a popular play.

BURGUNDY (bûr′gŭn-dĭ), once an independent kingdom of Europe, but now included chiefly in the French provinces of Yonne, Cotê-d'Or, Ain, and Saône-et-Loire. The ancient Burgundians were a Germanic tribe that settled on the banks of Vistula and Oder, and afterward spread to the Rhine and Neckar. In the year 407 A. D. they penetrated into Roman Gaul. Their kingdom was divided about 451, after a defeat of their King Gundicar by Attila the Scourge. In 534 they were conquered by the Franks, but a portion of their country became independent in 832. They again became powerful in 930, but in 1038 were annexed to the German Empire. Subsequently a number of changes in the ruling dynasties occurred which passed the title of their domain to various rulers. A portion of the region passed to Austria by the marriage of Mary of Burgundy to Maximilian, and a large part was acquired by Louis XI. as a male fief of France.

The first dynasty of Burgundy included twelve personages, who succeeded each other and ranked among the most powerful princes of their time; most of them were friendly with the kings of France. After the extinction of their line, the ruling influence passed to Philip the Bold, son of the French King John, and from him to his three successors: John the Fearless, Philip the Good, and Charles the Bold. These three sovereigns ranked among the most famous characters in the history of their time. During the reign of the last two mentioned, Burgundy included the Netherlands and several other countries.

The region included within Burgundy is fertile and productive. It is now penetrated by many railroads and contains the cities of Chalon-sur-Saône, Dijon, and Macon. The department of Cotê-d'Or is noted for its large output of Burgundy wines, which are celebrated for their rich flavor and delicate qualities.


EGYPTIAN SCULPTURE, SHOWING FUNERAL PROCESSION.

BURIAL (bĕr′rĭ-al), the disposal of the bodies of the dead. The disposition of the dead and the funeral rites differ greatly. They are influenced more or less by the state of civilization and the moral and religious sentiments of the people. A natural tenderness is felt for the bodies of those who were dear in life, from which fact the mode of burial has been greatly influenced, and the need of removing from sight the body after life has departed has caused the subject to be considered with concern and interest. The pagan Greeks and Romans had elaborate burial ceremonials, and from them came the practice of three-fold sprinkling with earth, which is now practiced extensively when the casket is lowered in the grave or set in the tomb. The three principal methods practiced by mankind are *mummification, incineration,* and *interment.*

Many savage people expose the body of their dead to be devoured by animals and birds of prey, a custom still in vogue among the Bushmen and other natives of Australia, who expose their dead in the limbs of trees. In India many bodies are thrown into the Ganges River, which the Hindus consider sacred as a stream flowing toward immortality. Mummification was the chief method in Egypt, where the bodies were embalmed and kept inviolate in expensive tombs, a custom that originated from the practice of burying in earthen jars, which was practiced to a great extent by the Babylonians. The Greeks and Romans patterned after the Egyptians to some extent in embalming the dead, but inhumation was a more general method, and later cremation came to be practiced. In some countries, especially in Assyria and Babylonia, the dead were buried very generally by placing the bodies on the surface of the ground and covering them with a mound, which was surrounded with stone and covered with decorations.

Interment in ancient times was more largely in tombs, and these were built on the property belonging to the family, but later burial grounds were set apart for the interment of persons belonging to a certain society or church, and subsequently community or municipal cemeteries were established. The popular plan at present is to inter the bodies in the ground to a depth of from four to seven feet, but in many places tombs are erected to receive the bodies, which are invariably placed in caskets made of wood or metal. Tombs are usually large enough for a number of persons or even a number of families, and where the ground is low and wet, as in New Orleans, this method of disposal is very popular. Many cemeteries are established and maintained by churches, but the tendency now is toward municipal ownership and control. Cremation, though practiced very extensively among the Greeks and Romans, went out of use with the rise of Christianity, but it is now gaining in favor on the ground that it is a more sanitary method. See **Cemetery; Cremation; Embalming.**

BURIATES (bōō-re-hēs′), a nomadic race of people native to southern Siberia. They are Tartars, a branch of the Kalmucks, and have been subject to Russia since 1664. They inhabit the region about Lake Baikal and support themselves by farming and stock raising, but more recently they have taken up mechanic arts and some branches of trade. A number have been converted to the Greek Church, though the larger portion retain a preference for their worship of idols. Their dwellings consist largely of huts, or *yurts,* and these are protected from the colds of winter by coverings of leather and felt. These people number about 250,000.

BURKE (bûrk), **Edmund,** philosopher and statesman, born in Dublin, Ireland, Jan. 1, 1729; died July 9, 1797. He entered the University of Dublin in 1744, graduated after four years of study, and secured a master's degree in 1751. Later he studied in London and became devoted to literary work. His first production was published in 1756, entitled "The Philosophical Inquiry Into the Origin of Our Ideas on the Sublime and Beautiful," which attracted much attention and secured him the friendship of many noted men, among them Dr. Samuel Johnson. He became a member of Parliament in 1765, where he secured distinction from the first on account of his excellent speeches and wide knowledge of human government and literature. The Rockingham ministry became dissolved in 1766, and he held no office in the ministry of Lord North. He published two pamphlets in 1769-70, entitled "Thoughts on the Cause of the Present Discontent" and "The Present State of the Nation." He delivered a number of speeches that thrilled all England, in which he advocated a liberal policy of justice and conciliation toward the colonies, including "On Conciliation with America."

Burke showed wonderful eloquence and mastery of detail in a number of speeches delivered in connection with the impeachment of Hastings, in which he was the prime mover. A strong opponent to the French Revolution, he published his famous pamphlet, "Reflection on the Revolution of France," in 1790, which was widely read, but it severed his friendship with many of the advocates of the Revolutionary party. He withdrew from Parliament in 1794. He is regarded one of the best orators of England, but his speeches were usually lengthy and failed to hold the attention. His writings are exquisite examples of beautiful rhetoric.

BURLESON, Albert Sidney, statesman, born at San Marcos, Texas, June 7, 1863. He practiced law at Austin, where he was city attorney and district judge, and in 1891 was elected to Congress. Later he was reëlected, serving continuously until 1913, when he entered President Wilson's Cabinet as Postmaster-General.

BURLESQUE (bûr-lĕsk′), a dramatic or literary composition tending to excite contempt or laughter by extravagant images, or by a contrast between the subject and the manner of treating it. In this form of composition, insignificant things are described in glowing terms, while elevated and important subjects of thought are treated in the most commonplace language. The writings of William Schwenck Gilbert (q. v.) contain good examples of burlesque in which fads and affectations play an important part, and the highest dramatic excellence is attained in the works of Molière. Chaucer's "Rime of Sir Thopas" is a burlesque on the tales of the Middle Ages, and Cervantes' "Don Quixote" is a popular work intended to ridicule the romantic tales of chivalry. *Vaudeville* is of French origin and corresponds to burlesque, but more recently it, like burlesque, has become a mixture of ballet and travesty.

BURLINGAME (bûr′lĭng-gām), **Anson,** statesman, born in New Berlin, New York, Nov. 14, 1820; died at Saint Petersburg, Russia, Feb. 23, 1870. His education was secured at the University of Michigan and the Harvard Law School, and he practiced law in Boston. In 1852 he was elected to the State Senate of Massachusetts. He was elected to Congress in 1854, where he became noted as an able speaker and an ardent opponent of slavery. President Lincoln appointed him minister to Austria, but the government declined to receive him in that capacity because he had spoken in favor of Hungarian independence. However, he was made minister to China in 1861, and, when his term expired, he was appointed special envoy to the United States and the principal powers of Europe by Prince Kung to make treaties with different nations, a distinction never before conferred upon a foreigner. The Burlingame Treaty was made between the United States and China in 1868, which was accepted by both nations, being based on the principles of international law. It conveyed to both nations certain privileges, among them the right to found schools and the freedom of religion. Burlingame visited Denmark, Sweden, England, Germany, Holland, and other European countries, and in 1870 reached Saint Petersburg, Russia, to negotiate a Chinese treaty, where he died.

BURLINGTON (bûr'lĭng-tŭn), a city in Iowa, county seat of Des Moines County, on the Mississippi River, 135 miles southeast of Des Moines, on the Chicago, Burlington and Quincy and other railroads, and has connection by steamers with ports on the Ohio, the Mississippi, and the Gulf. The chief buildings include the courthouse, the city hall, the opera house, the Federal building, and the central high school. It has a public library of 22,500 volumes, and is the seat of Burlington Institute College. The municipal improvements include systems of gas and electric lighting, central heating, sewerage, and street pavements of brick and asphalt. An extensive system of electric railways supplies urban and interurban communication. Near the city are rich limestone deposits. The manufactures include furniture, buttons, caskets, machinery, implements, flour, cigars, ironware, and soap. It has a large trade in lumber, cereals, and merchandise. It was first settled in 1833 and was chartered as a city in 1838. From 1837 until 1840 it was the capital of Iowa. Owing to its fine location and many parks and gardens it is called "Orchard City." Population, 1905, 25,318; in 1925, 26,375.

BURLINGTON, a city of New Jersey, in Burlington County, on the Delaware River, eighteen miles northeast of Philadelphia. It is on the Pennsylvania Railroad. It is surrounded by a fertile agricultural and fruit country, and has extensive manufactures of implements, ironware, flour carriages, and shoes. The chief buildings include Burlington College, Saint Mary's Hall, Saint Mary's Church (Episcopal), and a public library. The city has several fine schools and modern municipal facilities. It is the birthplace of James Fenimore Cooper. Quakers settled it in 1677, and it was incorporated in 1733. Population, 1920, 9,049.

BURLINGTON, county seat of Chittenden County, Vermont, on Lake Champlain, 35 miles northwest of Montpelier, on the Vermont Central and the Rutland railroads. It occupies a fine site on high ground overlooking the lake. In the center of the city is a large square, near which are the city hall, the county courthouse, the post office, the public library, and the customhouse. It has a large trade by steamboat navigation. The manufactories include cotton and woolen mills, marble and stone works, and flouring mills. The surrounding country is agricultural. Gas and electric lights, street railways, pavements, and waterworks are among the improvements. It is the seat of the State College of Agriculture, the University of Vermont, the Vermont Episcopal Institute, and many fine public schools and churches. Burlington was chartered in 1763, became a town in 1797, and was incorporated as a city in 1865. Population, 1900, 18,640; in 1920, 22,779.

BURMA (bûr'mȧ), a country of Southeastern Asia, the largest province of British India. It lies between north latitude 10° and 28°, and east longitude 92° and 101°. The boundary on the north is formed by Tibet; on the east by China, French Indo-China, and Siam; south by the Bay of Bengal; and west by the Bay of Bengal, Bengal, Manipur, and Assam. From north to south it has a length of 1,250 miles, and its breadth in the southern part is only 30 miles, while in the central part it broadens to a width of 550 miles. The area is 168,550 square miles, exclusive of dependent states, which have an area of about 68,500 square miles.

Description. Lower Burma, which extends south from about latitude 22°, is a narrow strip along the coast of the Sea of Bengal and has a level surface, while Upper Burma is diversified by level lands near the gulf and elevated plateaus in the northern part. It is separated from Tibet by ranges of the Himalaya Mountains, which approximate altitudes of 15,000 feet above the sea. The ranges diminish in height toward the south, and at Mandalay, situated near the central part, the altitude is about 6,500 feet. The chief ranges are the Patkoi Mountains in the north and the Garo Hills in the northwest.

Burma lies chiefly in the basin of the Irrawaddy River, which rises in the Himalayas and flows south into the Bay of Bengal by an extensive delta. Near Mandalay it is joined by the Chindwin, its largest tributary. The delta is very extensive, covering an area of 18,000 square miles, and during the rainy season this section overflows. In the eastern part the drainage is chiefly by the Salwin and its tributaries. The Salwin flows south and discharges into the Bay of Bengal near Maulmain.

The climate is various, ranging from the torrid in the southern part to the temperate in the higher altitudes of the north. In most sections the climate is tropical and the rainfall is very heavy. The coast ranges have a precipitation equal to 120 to 165 inches, and in some regions of the northern part the rainfall is irregular, ranging from 30 to 150 inches. The temperature in the lowlands has a mean average of about 85°, and in the interior the summers vary from 80° to 95°, while the winters are about 30° lower. Europeans find the lowlands unhealthful and the monsoons unpleasant. These winds blow from the sea in the summer, causing heavy precipitation, and in the winter they move from the north toward the sea, hence a dry season in winter and excessive moisture in summer.

FLORA AND FAUNA. Burma is rich in dense tropical forests, which include the valuable teak, ironwood, palm, betel, and bamboo. The cocoanut, palmyra, mango, and other varieties abound. Crotons, screw pines, balsams, oranges, pineapples, begonias, and many others are cultivated. Wild animals are abundant, both in the jungles and the mountains. They include the crocodile, tapir, goat, gibbon, buffalo, elephant, and many varieties of birds and monkeys.

MINERALS. Though rich in mineral wealth, Burma has not developed mining to any great extent. Ruby, amber, and sapphire are obtained in the sand of many streams, which is also a source of gold. Some mining is done for copper, iron, silver, lead, and antimony, but the output is not large. Coal and petroleum are abundant and considerable interest has been developed in quarrying white marble. This produce is obtained largely near Mandalay and is favored by the Buddhists in making sculptures and for decorating temples.

INDUSTRIES. Farming is the chief industry. The land is owned by the state and is leased to the farmer, who is required to pay a tax based on the extent and fertility of the land worked. Rice is the chief product and may be cultivated in about one-tenth of the country. Indeed, Burma takes first rank in the cultivation of this cereal. Other products embrace cotton, sugar cane, indigo, tea, rye, and vegetables.

The elephant is used extensively as a beast of draft and burden, but more recently the horse and mule have come to occupy an important place in farming. Cattle are grown extensively for dairying purposes, but the flesh is not eaten by the natives, since their religion prohibits meat eating.

Though quite important in the enterprises of manufacturing, no large establishments are maintained. The weaving of silk and cotton is a growing enterprise and is practiced in all of the cities. Earthenware of various kinds, jewelry, clothing, agricultural implements, and furniture are among the leading manufactures. Transportation is facilitated by the Irrawaddy, the Salwin, and a number of other rivers, some of which have been improved by embankments and connected with centers of trade by canals. A railroad line extends from Rangoon to Mandalay and other points of the interior and the northern section. Many highways have been improved and the chief cities have been fortified in modern style. The exports exceed the imports, and foreign trade is largely with China, Great Britain, Germany, and the United States. Rice, cotton, hides, India rubber, and lumber are exported. The chief imports include textiles, raw silk, fish, and metal products.

INHABITANTS. The inhabitants consist chiefly of Burmese, who are related to the Chinese. They constitute an important branch of the Mongolian race, and probably descended from people who came from Tibet. In stature they are medium and heavy-set, and have black hair, brown skin, broad skull, and black eyes. The language is monosyllabic, much like the Chinese, and their characters in writing are more or less circular. The civilization is stationary and stereotyped, maintaining its characteristic features from century to century. A large amount of wealth is lavished on temples, which are of much greater concern to the average Burmans than highways and public utilities. The religion is Buddhism, and their monks, numbering about 20,000, have a marked influence socially and politically. Rangoon, on the Rangoon River, and Mandalay, on the Irrawaddy, are the chief commercial centers. Other cities of importance are Maulmain and Myitkyina. The total population, including that of the dependent states, is 10,650,000.

GOVERNMENT. The government of Burma is under the viceroy of India, and is administered locally under a lieutenant governor, who is assisted by a legislative council at Rangoon. For the purpose of local government the country is divided into eight divisions, each of which is presided over by a commissioner, who is the chief executive and judicial officer. The divisions are subdivided into townships and villages, and these are presided over by Burman magistrates. The educational work is conducted largely through monasteries, of which there are many in all parts of the country, but the government is promoting training in public schools and institutions of higher learning.

HISTORY. The ancient and modern history of Burma is not important as it affects the history and civilization of the East. It is thought that the Burmans came to the valley of the Irrawaddy more than 2,000 years ago. The region was long divided into two kingdoms, those of Pegu and Ava, which contended against each other for mastery many years. The former seems to have attained its zenith about 1580, when the Peguans became dominant over all Burma, and they held sway until 1752, when a temporary decline began through European influence in the delta of the Irrawaddy. About that time the kingdom of Ava began to rise and overthrew the domain of Pegu. In 1755 the city of Rangoon was founded by Alompra, an energetic Ava chief, who made it the commercial center of Burma, which attained its greatest power as an independent nation in 1822.

The British East India Company gained a strong foothold in the latter part of the 18th century, when it founded factories and opened an important trade in the interest of Great Britain. Difficulties in consequence of disputes about trading privileges and the frontier were numerous in the early part of the 19th century, and in 1824 the British invaded Burma with a large army. This resulted in Assam being relinquished by the Burmese, and a second war in 1852 resulted in the annexation of Pegu as British territory. The British again invaded Burma in 1885 on account of disputes in regard to commercial concessions, relating chiefly to the transportation of timber, and the following year the remainder of Burma was proclaimed a part of Great Britain. In 1896 a treaty was concluded between France and Great Britain, by which the Mekong was made the boundary between Burma and Laos, a part of French Indo-China.

BURNAND (bûr′nand), **Sir Francis Cowley,** barrister and author, born in England, Nov. 29, 1836; died April 21, 1917. He studied at Eton and Trinity College, Cambridge, and took up theology to become a clergyman, but decided to take up the study of law and was admitted to the bar in 1862. His literary efforts at first consisted of contributions to periodicals, but he soon became successful in writing several dramatic pieces. In 1880 he bacame editor of *Punch.* His "Mokeanna" is a burlesque on sensational romance writing, and this was soon followed by "More Happy Thoughts," which went through more than twenty editions. His burlesque entitled "Black-Eyed Susan" was dramatized and ran 800 nights at the Royal Theater. Other productions include "His Majesty," "Quite at Home," "New Light on Darkest Africa," and "Cox and Box."

BURNE-JONES (bûrn-jōnz), **Sir Edward Coley,** artist, born in Birmingham, England, Aug. 28, 1833; died in London, June 17, 1898. He graduated from Exeter and Oxford, and was assisted in his study of art by Dante Gabriel Rossetti. He was elected to the Royal Academy of Arts in 1885, aided in establishing the New Gallery of Art in 1887, and was made a baronet in 1895. Among his works most noted are "Days of the Creation," "The Golden Stairs," "The Brazen Tower," "Aurora," "Love Among the Ruins," and "Legends of Briar Rose."

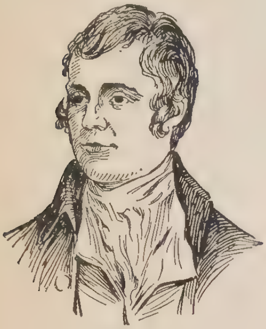
BURNETT (bûr-nĕt′), **Frances Eliza Hodgson,** writer, born in Manchester, England, Nov. 24, 1849; died Oct. 29, 1924. She came to America in 1865 and began writing for periodicals at an early age, one of her early stories being published in *Scribner's Magazine* in 1872. She married Dr. Luan M. Burnett in 1873, visited Europe, and on her return located in Washington, D. C. Her novels are extensively read; a number have been dramatized. Among her best productions are "Little Lord Fauntleroy," "Haworth's Louisiana," "Polly Pemberton," "Lass o' Lowries," "Little Saint Elizabeth," "A Lady of Quality," and "The Making of a Marchioness."

BURNHAM, Sherbourne Wesley, astronomer, born at Thetford, Vt., Dec. 12, 1838; died March 11, 1921. He took up the work of a stenographer, and for many years was a shorthand reporter in Chicago. He gave much attention to the study of astronomy while pursuing his stenographic work, and discovered a number of double stars. In 1876 he became connected with the Chicago Observatory and later with the Lick Observatory. He attracted wide attention by his successful work in these institutions and was made professor of practical astronomy in the University of Chicago. In 1874 he was made a fellow in the Royal Astronomical Society of England. He catalogued 1,274 new double stars, more than were observed by any other one astronomer, and published a general catalogue of these stars.

BURNING GLASS, an instrument to concentrate the rays of the sun. It consists of a double convexed lens, hence is thick in the center and thin at the edges, and brings the rays of solar heat to a focus at nearly the same point to which it brings the rays of light. This instrument is used to set fire on various substances, such as paper and wood. Burning glasses were made by the ancients, and Aristophanes and several writers declare that Archimedes fired the Roman ships by means of burning mirrors. George Buffon (q. v.), the French naturalist and philosopher, made a large reflector with which he set fire to wood at a distance of 210 feet, proving the possibility of Archimedes having thus burned the Roman fleet.

BURNLEY (bûrn′lē), a city of England, in Lancashire, 24 miles north of Manchester. It is located on the Burn River and the Leeds and Liverpool Canal, and has transportation facilities by numerous railway and electric railroad lines. The chief manufactures include textiles, clothing, machinery, and ironware. Slate quarries and iron mines are worked in the vicinities. The municipality owns most of the public utilities, including the gas and waterworks, slaughterhouses, public markets, and the electric lighting plant. It has public baths, a sanatorium, and several hospitals and technical schools. The trade is brisk, especially in cotton and worsted goods, machinery, and merchandise. Burnley is comparatively a modern city, and has regularly platted streets and many fine buildings of stone and cement. It was incorporated as a town in 1861. Population, 1921, 106,337.

BURNS, Robert, Scotland's great lyric poet, born near Ayr, Jan. 25, 1759; died July 21, 1796. He was a son of poor peasants, who manifested remarkable eagerness for his intellectual improvement. He was fond of reading and interested in writing poetry from early youth. Every effort was made to give him and his brothers and sisters a good education, but owing to a want of means his instruction was necessarily restricted. His library consisted of a small collection of poems and the Bible. He assisted in the labors of the farm in connection with his brother Gilbert, and devoted his spare moments to writing poetry and short sketches. In the meantime he learned French, the elements of Latin, and the popular songs of Scotland. In 1785 he formed a liaison marriage with Jean Armour, a person somewhat above his own position in life, and three years later he was legally married to her. His literary work was more successful than his farming, which proved an unprofitable enterprise, and he resolved to leave his native land and emigrate to Jamaica. For the purpose of securing means to pay his passage, he published a number of his poems at Kilmarnock in 1786. These were received with much favor and his genius became recognized in several localities.


ROBERT BURNS.

As he was about to leave Scotland he received words of encouragement from Dr. Blacklock, of Edinburgh, by whom he was advised to publish another edition of his poems. Accordingly, a revised edition was published and it met with a warm reception, netting him about $2,500. Instead of going to Jamaica he remained in his native country and made a number of valuable acquaintances. In the meantime he loaned a part of his money to his brother and with him rented a farm near Dumfries. In 1788 he was given the position of an exciseman with a government salary of $350, which he held in connection with the work of the farm. Here he continued his diligent labors with his pen, producing some of the most beautiful songs adapted to Scottish tunes, and many of his popular and immortal poems. It was unfortunate for him that he was located in so small a village as Dumfries, surrounded by a class of idle people, as this circumstance was at least one of the reasons why he was led to dissipate. His constitution was broken by irregularities, passions, and care. He began prematurely to decline, and became afflicted with rheumatic fever at the early age of thirty-seven. His intimate friends and admirers supported his wife and four children by subscription, and four volumes of his poems were published in 1800 by Dr. Currie, of Liverpool, for the purpose of furnishing additional support to them.

Burns ranks among the best Scottish writers. His works are characterized by a vigorous imagination and a vein of purity and honesty so deeply manifested in his heart. A monument was erected to his honor in 1833 at the town of Dumfries. His centenary was celebrated with unparalleled enthusiasm in 1859 in every village of Scotland and many of the cities of England, Australia, America, and India. Among his most noted productions are "The Cotter's Saturday Night," "Auld Lang Syne," "On Turning a Mouse's Nest with the Plough," "Scots wha hae wi' Wallace Bled," "Tam O'Shanter," "The Jolly Beggars," "Highland Mary," and "Ye Banks and Braes." Thus he expressed his fondest wish:

> "That I for poor auld Scotland's sake
> Some useful plan or book could make,
> Or sing a sang at least."

BURNSIDE (bûrn′sīd), **Ambrose Everett,** soldier and statesman, born at Liberty, Ind., May 23, 1824; died in Bristol, R. I., Sept. 3, 1881. His first occupation was that of a tailor. Later he studied at West Point, where he graduated in 1847, and served with distinction in the Mexican War. At the close of the war he invented a breech-loading rifle and began manufacturing it at Bristol in 1853. He enlisted at the beginning of the Civil War, commanding a brigade at Bull Run. In 1862 he captured the Confederates' garrison at Roanoke Island with 2,500 men, and later forced Forts Macon and Beaufort to surrender. He was transferred to the Army of the Potomac in 1862, and was promoted to be a major general, and engaged the Confederates in a battle at South Mountain Sept. 14, 1862. In the same year he took an active part in the Battle of Antietam, after which he succeeded Gen. McClellan in command, and was superseded by Maj. Gen. Hooker and transferred to the department of the Ohio. After 1863 he devoted himself to recruiting, and resumed command of an army of 20,000 men in 1864 under Gen. Grant. He took part in the battles of the Wilderness, Cold Harbor, and Petersburg, and resigned from the army on April 15, 1865. In 1866 he was elected Governor of Rhode Island, became interested in railroad construction, and went to Europe to act as envoy in the peace negotiations between Germany and France. He returned to America and was elected to the United States Senate from Rhode Island in 1875, and was reëlected in 1880. His public service was distinguished by devotion to public interest.

BURNT OFFERING, the object offered as an atonement for sins and burnt on the altar as a sacrifice. The practice of burning objects of value was in vogue both among pagans and the Jews, the former offering their sacrifices to idols and the Jews to Jehovah. Both animals and vegetable products were burned. When the whole offering was consumed upon the altar, it was known as the whole burnt offering. The peace offerings consisted usually of parts of animals, of which portions were given to the priests for their families. See **Sacrifice.**

BURR (bûr), **Aaron,** statesman, born at Newark, N. J., Feb. 6, 1756; died on Staten Island, N. Y., Feb. 13, 1836. He was the grandson of Jonathan Edwards, the son of a noted clergyman, and was left an orphan at an early age. After graduating at Princeton College, he joined the Revolutionary army as a private near Boston. He accompanied Benedict Arnold to Quebec, was promoted to the rank of major, and attained a high reputation. Washington invited him to his headuarters in New York, but he preferred to become aid to Gen. Putnam, which caused a break in Washington's friendship. Burr was made lieutenant colonel in 1777, distinguished himself at Monmouth in 1778, became a commander at West Point, and resigned in 1779 on account of impaired health. He studied law at Albany, and was admitted to the bar in 1782. He married Mrs. Augustine Prevost, a lady with British sympathies, and settled at Richmond Hill. In 1784 he became a member of the General Assembly in New York and five years later was made attorney general, which position he held two years. In 1791 he was elected to the United States Senate, serving six years, acting with the Republican-Democrat party, the name then given to the Anti-Federalists.

He was a candidate for President in 1800. Though the party received the largest support in the election, there was no choice, and he was elected Vice President, with Thomas Jefferson as President. Four years later he was a candidate for Governor of New York, but failed to secure the support of the leading men of his party and was defeated. His defeat was the direct cause of a duel with Hamilton, in which the latter was killed. Burr fled to the home of his daughter, Theodosia, in South Carolina, but was apprehended and tried for murder and acquitted. All his political prospects being dissipated, he turned his attention to founding an empire in the southwest. In 1805 he met Harman Blennerhassett and interested him in his schemes, surrounded himself with adventurers from East and West, and traveled through Kentucky and Tennessee to solicit recruits. His plans were discovered by Gen. James Wilkinson, a veteran of the Revolution, who reported them to the President. President Jefferson promptly issued a proclamation warning his followers to withdraw from the project. He was twice arrested, but finally acquitted.

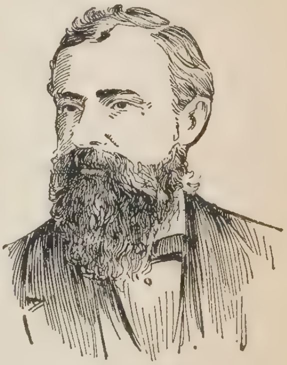
In 1808 he sailed to Europe with the intention of soliciting support to found an empire in Mexico, but was expelled from England, and then made fruitless efforts in the interest of his scheme in Sweden, Germany, and France. In this enterprise he failed and came to Boston in May, 1812, under the name of Arnot, in a penniless condition. Later he settled in New York and practiced law with good prospects, but in 1813 his daughter, Theodosia, one of the most accomplished women of America, was lost at sea while traveling from Charleston to New York to visit her father. This sad incident broke his spirits, but later, at the age of seventy-eight years, he married Mme. Jumel, the widow of a French merchant. He was a man of fascinating address and polished manner, to which his success was largely due.

BURRARD INLET, a narrow inlet of British Columbia, an arm of the Strait of Georgia, a short distance north of the mouth of the Fraser River. It is nine miles long and on its northern shore is the city of Vancouver. Its shores are covered with forests of firs, cedars, and pines, and it is noted for its fisheries.

BURRILLVILLE (bŭr′rĭl-vĭl), a town of Rhode Island, in Providence County, 22 miles northwest of Providence. It is situated on the New York, New Haven and Hartford Railway, and near it is Wallum Lake, a popular summer resort. The manufactures include textiles and machinery. Population, 1920, 8,606.

BURRITT (bŭr′rĭt), **Elihu**, known as the "Learned Blacksmith," born in New Britain, Conn., Dec. 8, 1810; died March 6, 1879. He learned the trade of a blacksmith and settled at Worcester, Mass. He devoted his leisure to the study of languages, mathematics, and sciences. Later he became editor of the *Christian Citizen*, advocating temperance, peace, education, and the emancipation of the slaves. Later he traveled in America and Europe, lecturing and seeking converts to his doctrines. He was appointed consul to Birmingham, England, in 1865. Among his best known works are "The Mission of Great Suffering," "Works in the Black Country," "Chips from Many Blocks," and "Handbook of the Nations."

BURROUGHS (bŭr′rȯz), **John**, essayist, born at Roxbury, N. Y., April 3, 1837. He was the son of a farmer and received an academic education. At the age of fourteen he began to write essays, and at nineteen he became a contributor to *The Atlantic Monthly*. In the meantime he was engaged as a teacher and journalist. Later he was appointed to a clerkship in the Treasury Department at Washington, D. C., which he held from 1864 to 1873. On retiring, he settled on a farm at Esopus, N. Y., and devoted his attention to literature and fruit culture. To be able to study nature by personal observation, he built *Slabsides*, a rustic house of boards, near his garden and celery farm. Here he observed the mysteries of the birds, insects, and flowers, and became able to impart to his descriptive phrases a distinctly literary flavor. Among his published works are "Locusts and Wild Honey," "Signs and Sea-


JOHN BURROUGHS.

sons," "Wake Robin," "The Ways of Nature," and "Birds and Poets." He died Mar. 29, 1921.

BURROWS, Julius Caesar, statesman, born in Northeast, Pa., Jan. 9, 1837. He studied law, was admitted to the bar, and served in the Union army in 1862-64. After the close of the war he was prosecuting attorney of Kalamazoo County, Michigan, and in 1873 was elected to Congress as a Republican. He served twelve years as a member of the House of Representatives, and in 1895 was elected to the Senate as the successor of Francis B. Stockbridge. He was reëlected to the Senate in 1899 and in 1905 by unanimous vote of the Legislature. During his service in the Lower House he was twice elected speaker pro tem. He died Nov. 16, 1915.

BURT, Mary Elizabeth, educator and author, born in Lake Geneva, Wis., in 1848; died Oct. 17, 1918. Became a teacher in the schools of Chicago, where she taught successfully ten years, after which she was chosen as a teacher in the Cook County Normal School. She was a member of the Chicago Board of Education three years, and after 1893 gave her attention largely to editorial writing. Her work as editor of the "Scribner School Reading Series" is well known among teachers. She addressed many educational associations and organizations in America and Europe. Among her chief writings are "Seed Thoughts from Robert Browning," "Stories from Plato and Other Classic Writers," "Eugene Field Book," "German Iliad," "Cable Story Book," "Howell's Story Book," "The World's Literature," "The Lanier Book," and "Literary Landmarks."

BURTON (bûr'tŭn), **Sir George,** jurist, born at Sandwich, England, in 1819; died Aug. 22, 1901. He came to Canada at the age of seventeen years, where he was educated and studied law. In 1842 he was called to the bar, and through diligent work built up a successful practice. For 23 years he was member of the court of appeals and in 1897 became chief justice of Ontario. His efficient services as chairman of the commission which revised and codified the statutes of Ontario were recognized by the government, and in 1898 he was made a baronet.

BURTON, John Hill, historian, born in Aberdeen, Scotland, Aug. 22, 1809; died Aug. 10, 1881. He studied at Marischal College, Aberdeen, and was admitted to the bar, but gave attention chiefly to literary work. Many of his writings consist of contributions on law and history to prominent periodicals, and he contributed to a large number of works of reference, including Chambers's Encyclopaedia. Among his books are "History of Queen Anne's Reign," "Life and Correspondence of David Hume," and "History of Scotland from Aricola's Invasion to the Revolution of 1688."

BURTON, Sir Richard Francis, traveler, born in Hertfordshire, England, March 19, 1821; died at Trieste, Austria, Oct. 20, 1890. He was educated in his native country and France, entered the Indian service in 1842, and explored Arabia in the disguise of an Afghan pilgrim, having previously learned to speak Arabic like a native. He was master of thirty-six languages and dialects. He served in the Crimean War, was consul at Fernando Po; at Santos, Brazil; at Damascus; and at Trieste, where he died. His many works include "The Nile Basin," "First Steps in East Africa," "Wanderings in West Africa," and a translation of the "Thousand and One Nights." He was accompanied by his wife, Isabel Burton, who died March 23, 1896. She was also a writer, and among other books published "The Inner Life of Syria" and "Arabia, Egypt and India."

BURTON, Robert, clergyman, born at Lindley, England, Feb. 8, 1577; died Jan. 25, 1640. He studied at Brazenose College, Oxford, and became vicar in that city. His "Anatomy of Melancholy" has gone through many editions. It is a medley of reflections and quotations from the pen of a genius and scholar.

BURTON-ON-TRENT, a town of Staffordshire, England, on the Trent River, twenty miles east of Stafford. It is surrounded by a level country, producing cereals, fruits and live stock. The river is crossed by a stone bridge with twenty-nine arches, and it has transportation facilities by several railroads and the Grand Trunk Canal. Among the public buildings are a public library, a college, and many fine churches and hospitals. The manufactures include ale, clothing, cotton goods, and machinery. The breweries are among the largest in the world. Burton was incorporated in 1878. Population, 1921, 48,275.

BURWASH, Rev. N., educator, born in Argenteuil, Quebec, July 25, 1839. He was educated at Victoria College, Coburg, and Yale University, and received his theological instruction at the Garrett Institute. In 1860 he entered the ministry of the Methodist Church, and six years later was appointed professor in Victoria College, where he became dean of the faculty of theology in 1873. He was made president and chancellor of Victoria University in 1887, and held important positions in the Methodist conference of Canada. As a member of the council of education for the province of Ontario he exercised a wide influence. His publications include "Wesley's Doctrinal Standards," "Inductive Studies in Theology," "Handbook on the Epistle to the Romans," "Manual of Christian Theology," and "Life and Times of Egerton Ryerson."

BURY (bĕr'ĭ), **a town in Lancashire, England,** eight miles north of Manchester. It is the seat of immense manufactures of woolen goods, fabrics, machinery, ironware, and dyestuffs. A fine stone statue of Sir Robert Peel, who was born near here, adorns the public park. It has many fine churches and school buildings, several hospitals, and good municipal improvements. Freestone quarries and coal mines are worked in the vicinity. It was incorporated in 1876. Population, 1921, 58,649.

BUSH BUCK, or **Boshbok,** an antelope of South Africa, so named from its habit of frequenting the thick underbrush. It is easily caught in the open country. The body is from four to five feet long and about three feet high, and the horns are triangular. It is esteemed for its venison. A similar animal known as white-backed bush buck is native to Sierra Leone.

BUSHEL (bụsh'ĕl), a measure of capacity, containing eight gallons or four pecks, used in measuring dry quantities. The bushel contains 2,150.42 cubic inches, and the standard cylinder used is eight inches deep and 18½ inches in diameter, inside measurement. This particular bushel is used in the United States, while the imperial bushel of Great Britain has a capacity of 2,211.192 cubic inches, equal to eighty pounds of distilled water.

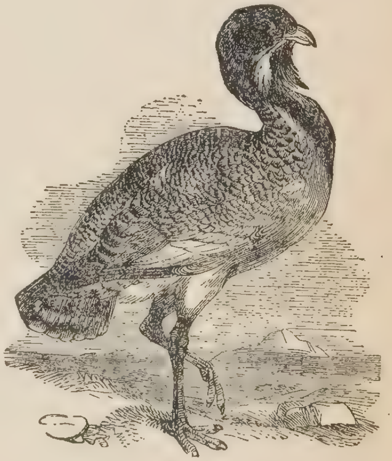
BUSHMEN, or **Bosjesmans,** a native race of South Africa, who dwell in the region of the Orange River. They are low in the scale of mankind and have made little progress in the arts of civilization. Their habitations are caves and clefts in the mountains, or holes in the ground covered with roofs of reeds. They support themselves chiefly by hunting and trapping and by gathering berries, roots, insects and reptiles, which they eat about half cooked. The dog is their favorite domestic animal. They have numerous legends and do a rude form of painting, but their language is very simple.

BUSHRANGERS (bụsh'rān-jẽrz), a gang of escaped convicts who frequented the forests of New South Wales in 1810-80. They robbed banks, plundered villages, and laid tribute on the settlers. Subsequently they infested Van Dieman's Land and frequented the mountainous districts of eastern Victoria. They were exterminated under martial law proclaimed by the governor in 1815, but the last of their gang was not executed until 1880, when three were shot at Melbourne.

BUSINESS COLLEGE, an institution in which students of both sexes are trained for commercial employment. These schools have been promoted for many years, or departments doing similar work have been maintained in public schools or normal colleges, but since the middle of the last century they have multiplied greatly. This is due to the fact that stenography, typewriting, and telegraphy have demanded more attention, and through these branches of study all lines of office work have been modified to a great extent. Business colleges do not only teach the three branches mentioned, but in addition provide courses in bookkeeping, commercial arithmetic, commercial law, commercial geography, and one or more modern languages, especially German, French, or Spanish. All the larger cities of the United States and Canada have one or more business colleges, and in these countries commercial departments are maintained in a large number of high schools. Writers of text-books have supplied outlines and texts suitable for class work in all the branches taught, and these are quite as numerous as those offered for use in public schools and colleges.

BUST, in sculpture, the representation of the chest and the upper part of the body. The earliest bust known is that of Scipio Africanus the Elder. Busts were very common in the literary period of Greece and quite extensive in Rome. By means of them we have good representations of the faces of Plato, Socrates, Demosthenes, and many other Greek characters; and of Caesar, Cicero, Cato, and other eminent Romans. However, they are less common among the latter. King Louis I., of Bavaria, made the most celebrated collection that exists, now at the Walhalla, about seven miles east of Regensburg (Ratisbon), Germany. Among the busts are 101 representations of eminent Germans.

BUSTARD (bŭs'tẽrd), a bird of the Eastern Hemisphere, belonging to the order of runners. The great bustard was once common to the British Isles, and is still found in the south-eastern part of Europe and in Tartary. It measures six to seven feet from wing to wing and weighs thirty pounds. The little bustard is common to Europe. Several species are found in Africa and one is native to Australia, but none is found in America. The bustard family is esteemed for food, but attempts to domesticate these birds have failed.



GREAT BUSTARD.

BUTCHER BIRD. See **Shrike.**

BUTLER, a borough in Pennsylvania, county seat of Butler County, about twenty-three miles north of Pittsburg, on the Bessemer and Lake Erie, the Pennsylvania, and other railroads. It has a growing trade in minerals and